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2017 SCAT (Shoreline Cleanup Assessment Technique) Workshop Report

Coastal Response Research Center (CRRC)

SCAT for Tomorrow Workshop

Photos credit: NOAA ORR

January 18-19, 2017

NOAA's Gulf of Mexico Disaster Response Center

Mobile, AL

Workshop Report

Coastal Response Research Center

Acronyms

ARD	Assessment and Restoration Division (ORR)
ASTM	American Society for Testing and Materials
CAOSPR	California Department of Fish and Wildlife, Office of Spill Prevention and Response
COP	Common Operational Picture
CTEH	Center for Toxicology & Environmental Health LLC.
DOCL	Documentation Unit Leader
DRC	Gulf of Mexico Disaster Response Center
ERD	Emergency Response Division (ORR)
ERMA	Environmental Response Management Application
ETL	Extract, Transform, Load
EU	European Union
FGDC	Federal Geographic Data Committee
FOSC	Federal On Scene Coordinator
FTP	File Transfer Protocol
GIS	Geographic Information System
IAP	Incident Action Plan
ICP	International Cooperative Program
ICS	Incident Command System
JIC	Joint Information Center
LNO	Liaison Officer
NCP	National Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NOO	No Oil Observed
NRDA	Natural Resource Damage Assessment
OCC	Owens Coastal Consultants Ltd.
ORR	Office of Response and Restoration (NOAA)
RAT	Rapid Assessment Team
RPI	Research Planning, Inc.
SCAT	Shoreline Cleanup Assessment Technique
SSC	Scientific Support Coordinator
SITL	Situation Unit Leader
SQL	Structured Query Language
STR	Shoreline Treatment Recommendation
TGLO	Texas General Land Office
TRG	The Response Group Inc.
UC	Unified Command
USCG	United States Coast Guard
QA/QC	Quality Assurance/Quality Control

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- Carl Childs, NOAA ORR ERD
- Whitney Hauer, CRRC
- Charlie Henry, NOAA ORR DRC
- Michele Jacobi, NOAA ORR
- Nancy Kinner, CRRC
- Kathy Mandsager, CRRC
- Mark Miller, NOAA ORR ERD
- Zach Nixon, RPI
- Ben Shorr, NOAA ORR ARD
- John Tarpley, NOAA ORR ERD
- David Wesley, NOAA ORR ERD

The workshop was facilitated by Nancy Kinner from the Coastal Response Research Center (CRRC; www.crrc.unh.edu) and was held at the DRC in Mobile, AL. CRRC has extensive experience with issues related to oil spills. The Center is known for its independence and excellence in the areas of environmental engineering, marine science, and ocean engineering as they relate to spills. CRRC has conducted numerous workshops bringing together researchers, practitioners, and scientists of diverse backgrounds (including from government, academia, industry, and non-governmental organizations) to address issues in spill response, restoration and recovery.

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- Jeff Arnett, Shell
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Introduction

On January 18-19, 2017, the Coastal Response Research Center (CRRC)[1] and the National Oceanic and Atmospheric Administration (NOAA) Office of Response and Restoration (ORR) Gulf of Mexico (GOM) Disaster Response Center (DRC) co-sponsored the "Shoreline Cleanup Assessment Technique (SCAT) for Tomorrow" workshop at the DRC's training facility in Mobile, AL. NOAA ORR supports the U.S. Coast Guard (USCG) in its role in emergency response (Emergency Response Division [ERD]) and also overseas damage assessment and restoration (Assessment and Restoration Division [ARD]). As part of its role, ORR updates existing tools and creates new ones related oil spill response, assessment and restoration. The workshop assisted ORR in advancing SCAT with respect to data standards and data exchange.

Collecting, managing and sharing SCAT data collected or managed by different organizations can be difficult due to the various data methods and formats used. One of ORR's major goals is to develop a common data standard for SCAT that is acceptable to federal and state agencies, and industry, and enhancing information sharing.

The workshop convened a group of 47 SCAT coordinators, data managers, and stakeholders from international, federal and state agencies and the private sector (Appendix A), to define key standards to allow better management and sharing of SCAT data for response and other purposes. Workshop participants discussed the draft NOAA SCAT Digital Data Standard (herein referred to as the draft Data Standard; Appendix B) and exchange formats to make SCAT more efficient and interconnected during oil spill response. The workshop agenda is located in Appendix C.

There are numerous, distinct applications of SCAT products available in the private and public sectors, each of which has characteristics that may be used by a variety of clients. The workshop explored the 'behind-the-scenes' data-sharing and interoperability aspects of SCAT with the goal of improving information sharing during oil spill response and restoration.

The workshop objectives were to:

- Assess of current concerns regarding electronic data management for SCAT in oil spills;
- Evaluate of future needs for SCAT to improve readiness and efficiency;
- Define of key data standards and data exchange formats to allow better management and sharing of SCAT data for response and NRDA; and
- Provide feedback from stakeholders on the draft Data Standard and for data sharing agreement strategies regarding SCAT.

The workshop consisted of plenary presentations, panel presentations and discussions, breakout sessions, and plenary discussions. Plenary presentation topics included: setting the stage, data collection and information tools, data sharing agreements, data infrastructure, IT security, and the draft Data Standard. Panelists provided reactions to the plenary presentations and included state, industry, and federal agency perspectives. Panel presentations focused on available SCAT data tools. Slides for plenary and panel presentation are located in Appendix D.

[1] A list of acronyms is provided on Page 1 of this report.

The breakout sessions included discussions of: electronic data management during spills; future needs to improve readiness and efficiency; technical aspects of the draft Data Standard; data handling and exercise development; and Quality Assurance/Quality Control (QA/QC) and data flow. The workshop concluded with a plenary discussion of best practices and the path forward.

The information reported below is the best attempt to document the discussion, opinions and ideas presented during the presentations and breakout sessions of the SCAT for Tomorrow Workshop. The summary below does not necessarily reflect the view or products of NOAA or any single participant. This information does not reflect a consensus of opinion, but simply reflects the various group report outs.

Plenary Presentations

A summary of each presentation from the workshop is provided in this section. Most summaries were written by the presenters.

Setting the Stage on SCAT

John Tarpley (NOAA ORR ERD) and Ed Owens (Owens Coastal Consultants Ltd. [OCC]) provided an overview and history of SCAT. Nearly 30 years ago, oil spill responders began to develop a method for assessing oiled shorelines. Over time and with each new spill, this method was refined and new tools developed specifically to support oil spill cleanup operations. SCAT was 'born' in 1989 during the Exxon Valdez response. Later, these assessments became integral to the Incident Command System (ICS) providing critical information to decision-makers in the Operations and Planning Sections. Through the work of dedicated responders, SCAT tools and techniques continued to evolve to support a wide range of habitats and an increasing demand for faster and more detailed information and SCAT products. Key to this ongoing development and innovation has been a collaborative relationship among SCAT practitioners to improve the technique and foster its use world-wide. Today, the response community is a crossroads with the digital development of SCAT. As more tools are created to support electronic data collection, databases are established to store large volumes of information, and more ties are made with geographic information system (GIS) mapping tools; SCAT practitioners need new standards and data exchange formats to handle digital data across different platforms for efficient coordination, data sharing and interoperability.

SCAT Data to Response Information

Carl Childs (NOAA ORR ERD) presented the data elements collected by SCAT teams in the field and the analytical process by which those data are transformed into SCAT information products to guide response activities. Generation of the information products describing the extent of shoreline oiling only uses a small subset of the data collected by field teams. These data are evaluated using incident-specific criteria and transformed using a complex geospatial methodology to create a comprehensive assessment of shoreline oiling conditions.

SCAT field data is of little use to the response unless it is systematically analyzed and collated in order to inform response decisions. Without significant interpretation, raw field data can provide an incomplete and misleading picture of the situation which is particularly important given that advances in electronic field data collection make SCAT data available in near real time in the Command Post. This requires that extra care is taken to ensure that SCAT information presented to the rest of the response has undergone proper QA/QC and analysis.

Data Sharing Agreements and Federal Data Mandates

Michele Jacobi (NOAA ORR) presented data sharing plans and federal data management policies. Access to appropriate information and accurate data is required for an effective spill response operation. The response data and informational products generated are essential to situational awareness. These data support the Common Operational Picture (COP) of the incident and inform the operational decisions for the field crews. In order to have effective situational awareness, a data sharing plan is key; it should be cooperatively generated for each incident and be signed by the Unified Command (UC). The plan should document the collection, management, and access to essential datasets for all parties involved in the incident. Data sharing plans should focus on the timing of data and product delivery, standard format requirements, data interoperability, and data retention requirements. Industry, federal and state agencies should work together on plan development, and practice the implementation of data sharing plans during drills and exercises to help ensure efficient information flow and resolve potential issues in advance of an actual incident.

In addition, the need for data access and sharing, there are several federal data management mandates that must be considered when collecting response data or generating informational products. These requirements include the National Contingency Plan (NCP), the Federal Records Act, the Freedom of Information Act, and the Open Data Policy. Several agency level data directives also must be considered. Each of these policies outlines a documentation and management requirement for the specific federal agency and its support staff. Additional state and corporate requirements may exist for data sharing and retention and all of these requirements must be taken into account when managing spill response data.

Data Infrastructure

Ben Shorr (NOAA ORR ARD) gave an overview presentation on the type of infrastructure and data flow that NOAA ORR considers key to the effective collection, management, and sharing of environmental data, including SCAT data. Key aspects of a SCAT data management approach prioritize scalability and flexibility, and provide for secure data collection, management, sharing, and archiving. Scalability refers to the ability for a SCAT data collection approach to work on small as well as very large spills. Flexibility refers to the ability to quickly adapt to gathering, managing and integrating different data sources and formats, including electronic collection systems. The data collection aspect covers the different pathways that SCAT data may be gathered, and the central data that is commonly referred to as structured (e.g., spreadsheets) and unstructured (e.g., scanned field notes, photos). The approach for data collection and data storage emphasizes gathering all essential data elements in a central and organized location. Interoperability is key as it addresses the ease of getting data in and out of a system. The requirements for data collection and data access should be based on clear and accessible standards, which allow for data providers and data users to readily exchange data and information. The NOAA SCAT data model can serve as a template for data providers to use, and a guide for data access from a centralized system that implements this data standard. The SCAT data flow includes the core requirements for exchanging metadata (i.e., Federal Geographic Data Committee (FGDC), SCAT data specific), in addition to incorporating QA/QC and validation. The SCAT data model is key to the “data warehouse”, which is a centralized environmental data store that provides secure and privileged access to integrated and raw data.

IT Security Issues

David Wesley (NOAA ORR ERD) provided a brief introduction to some of the existing federal IT security rules and how they may impact management of SCAT data in the future. IT security rules, along with other mandates, have been tightening for federal agencies and these changes are impacting the technology solutions available for managing federal data. For example, SCAT has evolved from being located on a single computer to being hosted on a server with multiple users in the Command Post. Government data must be on a government-certified server. The assessment and authorization process to become government-certified is costly and requires extensive documentation.

Draft NOAA SCAT Data Standard

Zach Nixon (Research Planning, Inc. [RPI]) provided an overview of the proposed draft NOAA Data Standard, including the concept, guiding principles, and core components. The Data Standard is intended to facilitate interoperability, clarity, and transparency for digital SCAT data. It is software agnostic, includes simple, core elements, and is not an application, database, data structure, or entity-relationship model. The Data Standard is extensible to better the requirements of a wide spectrum of incident complexities and specific needs. It is intended to apply to digital SCAT data management over the whole lifecycle of an incident, from data collection to final archiving. The core elements are:

1. Conceptual entities,
2. Spatial representations,
3. Tabular attributes,
4. Logical relationships,
5. Spatial relationships, and
6. Documentation.

The core conceptual entities are: a shoreline, segments, surveys, surface oiling observations (zones), subsurface oiling observations (pits), and shoreline treatment recommendations (STRs). Of these, the shoreline and its segments, and zones and pits are required to have explicit spatial representation. Each conceptual entity is required to have certain pieces of core information contained in a table. While structure and format of these tables is flexible, they must meet minimum logical relationship tests. Similarly, the draft Data Standard requires that spatial representations meet minimum spatial relationship or topological requirements. Lastly, the draft Data Standard requires documentation sufficient for external users.

Panel Perspectives

There was a panel discussion offering a state, industry, NOAA, and USCG perspective which provided comment and feedback on the plenary presentations.

State

Steve Buschang (Texas General Land Office [TGLO]) provided a state perspective. In his role as state Scientific Support Coordinator (SSC), he is involved in the SCAT process on a more day-to-day basis where scalability is important. While the state needs to work with and participate in large SCAT operations, the majority of TGLO SCAT activities occur on small spill events, often in the capacity of a Rapid Assessment Team (RAT) survey. SCAT should be user-friendly for small spill and large scale applications.

For those who teach SCAT, digital SCAT should be incorporated into the classroom. However, there may be challenges given the number of available SCAT data tools and devices. More importantly, paper SCAT should remain the focus as it will not be completely replaced by digital SCAT.

TGLO is considering pre-segmenting SCAT areas where the segmentation of Resources at Risk (RAR) may coincide with pre-segmented areas.

Industry

Jeff Arnett (Shell) provided an industry perspective highlighting the importance of data interoperability. There is a need for a SCAT framework, and the draft Data Standard provides those guidelines. Next steps for SCAT include implementing the draft Data Standard in the field. Technology is available (e.g., ESRI) to minimize post processing and normalize data in the field.

NOAA

Zach Nixon provided a discussion on SCAT data tools and highlighted two main points:

First, the primary tension in SCAT data management is between the competing requirements of efficiency and quality. By definition, the first and primary "customer" for SCAT data and information products within the response is Operations. The primary reason for collecting SCAT data is to provide timely generation of operational guidance for shoreline cleanup during the response. The most important attributes of any SCAT data management program should be speed and flexibility. However, SCAT data are also critical to other non-operations entities within the Incident Command System (ICS), including generating metrics of survey and cleanup progress for command staff and public release, and other entities for non-response needs such as NRDA. For these users and purposes, it is more important for data management processes to ensure that SCAT data are standardized and of high quality. While these two sets of requirements will always be in competition, the adoption of a minimal, though rigorous and extensible, standard may ease this tension.

Second, the operational period and planning cycle tempo for large or high visibility incidents is often 12 hours or less for certain aspects of SCAT data management. While certain aspects of the QA/QC process, by design, will always insert some delay during the SCAT data workflow, the use of an agreed-upon Data Standard will help SCAT practitioners reduce this delay to the minimum needed to meet the needs of increasingly rapid planning cycles.

USCG

CDR JoAnne Hanson (USCG) commented that recent large incidents have demonstrated an information demand from higher level officials (e.g., White House, Department of Homeland Security) which continues to increase with each successive response. In turn, this causes pressure on the Federal On

Scene Coordinator (FOSC) and UC to report information quickly. Further, we live in a on-demand information management world, compounded by the real-time access of social media.

IT challenges will continue to require resolution. As more electronic products and systems are developed for use on a response, the USCG will face issues with data transfer and management on secure systems. Documentation on a response is an FOSC's responsibility. Data generated on a response belongs to the response and the FOSC, so the data transfer mechanisms must be addressed in order to properly access, maintain, and store response data in accordance with government IT security and legal requirements.

Panel on SCAT Data Tools

The panel on SCAT data tools showcased different tools that are available. Panelist were asked the following:

- *Describe the key features of your SCAT product.*
- *What are the innovative/novel approaches associated with your SCAT product? What new data are being collected? What are the new SCAT information product ideas?*
- *How does the data flow in your SCAT product?*
- *What features of your SCAT product align with the draft Data Standard?*
- *What impact might the draft Data Standard have on your product?*

SCATMAN

Kenneth Kumenius (SCATMAN Ltd.) discussed (via video link) SCATMAN which offers mobile tools for field data collection and management, including SCAT which has been tailored for NOAA. The tools are easy-to-use, fast and offer reliable ways to collect and report data from the field to the Command Post. Possible use-cases vary from surveys and mappings of environmental and natural issues to industrial field operations including asset management, field service, safety, and quality related tasks.

SCATMAN applies normal touch screen smartphones or tablets for easy and reliable in-field data collection and management. Data from the field are updated automatically, in real-time, to the SCATMAN web service where the data are summarized and visualized on a map presentation. It can also work offline. Necessary actions can be decided quickly based on this information. Data can also be integrated with other existing systems and tools used in the company and synchronized into other existing databases.

Technology that is integrated into the system are: drones with laser measurement to estimate the thickness of the oil, dark sensor cameras to take pictures in nearly complete darkness, gas sensors to identify the gas, and physical sampling to identify the quality of the oil. SCATMAN can easily fulfill the draft Data Standard requirements.

For more information: http://scatman.fi/en

Chaac Technologies: Coral

Guillaume Nepveu (Chaac Technologies) discussed Coral which is a mobile geospatial data collector developed by Chaac Technologies. Coral was created originally as a SCAT data management tool.

One key component is that Coral supports all types of features including points, lines and polygons which is essential to manage the complex nature of the geospatial data capture during an oil spill response. Coral also has multiple GIS functions that permit geometry edition. Coral is powered by a dedicated cloud service that provides real-time data access and automated backups for extra data security.

One innovative approach in Coral is the data viewer that provides a new way to explore the data. It is composed of a split screen which includes fields from the data model and an interactive map that puts this data into spatial context. All media, including photos, videos, sketches and maps, are also fully integrated into the system and georeferenced automatically. Sketches can be created using a blank background, satellite imagery or a picture. These media can also be linked to all features providing a binding bound that correlates the data together.

The data flow in Coral can be handled in three ways: data export, data import and data synchronization with the cloud. Coral's ability to manipulate geospatial features efficiently aligns with the required spatial topology in the draft Data Standard. Modules like the snap to algorithm and the zone builder that permits the creation of zones overlapping the segment lines are examples of this alignment.

The impact of the draft Data Standard to Coral infrastructure is minimal. It is only a matter of creation of new forms to match the proposed data model. Coral provides a form creation module that allows assignment of data fields (e.g., text, radio buttons, media, signature) to a form and that can be exported to the cloud server. This form is then accessible to all users connected to the cloud. The form creation module also links forms together (e.g., user can choose the geometry type and control how the feature will be represented on the map with icons or colors).

For more information: www.chaac.tech or http://coralmobile.net/.

Polaris Integrated SCAT Management (PRISM) Application

Stephen Gmur (Polaris) discussed the Polaris Integrated SCAT Management (PRISM) Application. For several years, and especially since the DWH, Polaris has been increasing the efficiency of SCAT data collection and processing with the goal of decreasing errors which might be inherent within the traditional workflow. Results of this effort from the last couple of years have identified a variety of different applications to collect SCAT data, both general mobile data collection applications and SCAT specific applications. Many of the applications reviewed had good data collection features, but what was lacking was how data collected was stored and could be queried and processed after collection (i.e., the database component of the set up). To close the gap between data collection and data storage, Polaris decided the best strategy was to develop an enterprise level database that was web enabled with a SCAT specific data model. The concept for this strategy is that data from any mobile application could be used loaded into the flexible PRISM data structure. In the short term, a third party mobile application could be used until other collection applications are evaluated.

PRISM, the updated workflow, is not a single component, but comprised of several parts. Underlying data principles used to design the PRISM data model are the same as the draft Data Standard. Specifically, the data model has the same components of surveys, segments, zones, pits and STRs along with a few additional pieces of information. To address the need for topologically-corrected post processed data, the PRISM workflow includes post-database tools which snap field collected information to the segmented shoreline. Naming conventions within the database are different, but can be mapped to a cross reference table to follow the Data Standard. Polaris is currently developing metadata templates and will be using the metadata portions of the Data Standard to identify any gaps.

The updated SCAT workflow is able to follow the draft Data Standard due to the different components which are used within PRISM. PRISM resides on an Amazon webserver and is built upon Arches, an open source database platform, which was originally designed for cataloging historical resources. The web interface allows reviewing, searching and exporting data. Field collection uses Fulcrum, a third party data collection app. The innovation associated with the new workflow is that newer technologies have been integrated. Mobile data collection to increase speed and efficiency, web based databases as a single source for all SCAT data and to increase the transparency of how those data are stored and along those lines increasing the access to a variety of user for that data.

For more information: http://www.polarisappliedsciences.com/en/home/.

The Response Group (TRG): SCAT Mobile Application

Kenny Rhame (TRG) presented on TRG's SCAT Mobile Application named TRG Recon which is the latest addition to their suite of mobile apps. This mobile application allows SCAT field teams to capture data in the field improving quality and efficiency. TRG Recon records all information required to complete the NOAA Shoreline Oil Summary (SOS) form which is available in TRG's Incident Action Plan (IAP) software. Users can capture photos and notes, while having flexibility to work offline. Completed NOAA SOS forms in the IAP software have a status approval workflow that requires QA/QC and approvals with digital signatures before the final report is available for others to review. Streamlining the data collection and form approval allows SCAT teams to quickly generate Shoreline Treatment Recommendations (STRs) which guide Operations to the highest priority areas. The collected data and reports are processed to create SCAT products including oiled shoreline maps and SCAT photos. This approved data is displayed on the COP and optionally dashboards can be created as a briefing tool for UC.

For more information: http://www.responsegroupinc.com

CAOSPR: SCATalogue iOS app

Issac Oshima (CAOSPR) discussed the SCATalogue iOS app. Key features of the SCATalogue iOS app include:

- Data capture from NOAA Shoreline SCAT SOS forms,
- Data exports to ESRI geoJSON format,

- Photos, sketch, photo annotation option, and
- ArcGIS custom toolbox process into file geodatabase(s).

One of the novel approaches associated with the SCATalogue iOS app is the multiple ways to push data which include: email, USB flash, and the cloud (e.g., AirDrop, Dropbox, OneDrive, Google Drive). Additionally, shoreline representation and/or segments can be generated by ArcGIS using SCATalogue GPS tracklog. When shoreline segments are available, oiling zones are snapped to them. No oil observed (NOO) zones can either be explicit or inferred. For team lists, the app pulls data from the California Department of Fish and Wildlife File Transfer Protocol (FTP). Team lists can also be created via iOS contacts and ad hoc.

Data can be transferred via email, Apple airdrop, as well as via cloud, flash, and third party apps such as AirTransfer which is dependent on the user/organization. There is OSPR GIS unit processing into an ESRI file geodatabase (individual survey-segment) and into an ESRI Structured Query Language (SQL) geodatabase (spill compilation). Data flow includes the International Cooperative Program (ICP) and other mapping products as well as posting to the Environmental Response Management Application (ERMA).

The SCATalogue iOS app aligns well with the draft Data Standard and any differences can be addressed. Depending how voluntary the Data Standard becomes, it may impact the SCATalogue iOS app and OSPR's positive oil sighting protocol. OSPR uses geodatabases with shapefile output for ERMA. The output can be manipulated and is flexible, however, the app may need coding changes with the Apple app process.

For more information: https://www.wildlife.ca.gov/OSPR.

Center for Toxicology and Environmental Health, LLC (CTEH): Rapid Assessment Tool

Brady Davis (CTEH, LLC) presented on the tool that is best used simultaneously with SCAT. The Rapid Assessment Tool is a rapid, visual qualitative evaluation of shoreline conditions based on elements consistent with SCAT. The key features of the Rapid Assessment Tool are real-time reporting, advanced data visualizations, and IC support. As a case example on the Yellowstone River, CTEH assessed 27 miles of the river with two teams of three people in five days and made 8,162 oil observations with the tool. CTEH also used the tool to make 224 observations with two people following a chemical fire where the responders put dye in the water to determine the hydrography. The innovative and novel approaches of the Rapid Assessment Tool are that it is a scalable, easily customized app used on a flexible mobile framework (e.g., Android, Apple, Windows) which also offers offline data capture. Once the field data is captured using the app, the data is synchronized to CTEH's mobile data studio data server which is extracted, transformed, loaded (ETL) into the CTEH central data server. At that point, the data is reviewed using multiple quality controls. Once the data has gone through QA/QC, it is available for use in a CTEH on-site database and any approved third party databases, as well as CTEH response deliverables pertaining to GIS, cloud services, and reports. The features of the tool that most align with the proposed Data Standard are the attributes used for survey data collection and the suggested file formats used for data exchange. In order to be more aligned with the draft Data Standard, CTEH would need to add attributes such as survey method, tide height, and fields for multiple survey personnel. Not only would CTEH need to add attributes, but they would need to edit and append valid values and edit column names to align with the suggested columns name in the Data Standard. CTEH believes that the Data Standard would be a great guidance tool for any future development in regards to SCAT.

For more information: http://www.cteh.com.

Breakout Groups

Workshop participants were divided into small groups for breakout sessions. The first breakout session consisted of four parallel groups (i.e., each group discussed the same topic) and an effort was made by the organizing committee to have a distribution of participant expertise in each group. The second breakout consisted of three different groups in which participants were distributed by the organizing committee based on their role in SCAT. A list of breakout groups is located in Appendix E. Each group had a group lead to help facilitate the discussion and a note taker equipped with a laptop and projector to capture and display discussion points. The summaries presented below are an amalgamation of the key points identified by the breakout groups for their plenary reports following each session. The detailed breakout session notes are in completed predetermined templates and are available in Appendix F.

Session I

For the first breakout session, participants were divided into four parallel groups to address current concerns with respect to electronic data management for SCAT during oil spills and future needs for SCAT to improve readiness and efficacy.

Electronic Data Management for SCAT during Oil Spills

Multiple groups raised the issue that there will be situations where electronic devices will not be used and paper will be used. Field notebooks, GPS units, and cameras also provide data redundancy. Additionally, shifting from paper to electronic SCAT, there are levels of QA/QC that are lost. Multiple groups discussed the QA/QC process and the need for a standardized process and tagging system to determine the status of data and reports, as well as version control of files.

It is important to determine who gets access, when, and to what degree of detail to SCAT data. There may be different levels of security for access and control. External access to generated information products is available after data has been through QA/QC.

Offline requirements should be addressed for applications that rely on the internet.

Multiple groups raised the concern of releasing provisional or preliminary data and its use in decision making.

One group discussed electronic signatures and requirements as a part of STRs and other operational decision documents.

Future Needs for SCAT to Improve Readiness and Efficacy

The future of SCAT includes drones, canines, and other devices and there must be the ability to capture new forms of data. Best practices for the use of drones in SCAT data collection should be developed.

The immediate data transfer from the field should be separate from the formal SCAT process. One group suggested automating Extract, Transform and Load operations (ETL) in order to make a standard output and to produce products.

It is important to understand what data are available from outside sources and the limitations of their use.

One group discussed whether electronic data management should take other consultations (e.g., wildlife, State Historic Preservation Offices) into consideration in the immediate response (e.g., SCAT access, restricted areas) and STR consultation process. Another group discussed whether there is the ability to geo-reference notes and observations for good information that lacks spatial data.

Another group recommended that the data exchange deliverable be included in the draft Data Standard.

Session II

The second breakout session was divided into three different groups: (1) software developers and data managers discussing the draft Data Standard, (2) SCAT practitioners and customers discussing data handling, and (3) SCAT coordinators discussing QA/QC and data flow. While best practices were introduced during the breakout session, they were refined during the plenary discussion with all participants; best practices are discussed in a separate section.

Technical Discussion of the Draft Data Standard

The group consisted of software developers and data managers and discussed (1) segmentation and pre-segmentation, (2) additions to the draft Data Standard, and (3) data exchange formats.

The draft Data Standard allows for but does not require any segmentation and pre-segmentation. There may be locations (e.g., California) more suitable for pre-segmentation. Segments may evolve with multi-season response which is one reason why there is pressure to move away from having segments as a primary key requirement. The group recommended keeping all versions of segments and adding the start and stop dates related to segments.

The attributes used to produce products and make response decisions (e.g., oil maps) are essential to the Data Standard. It is important to address tracking over multiple seasons. There is other information (e.g., tide level at time of survey) that can be entered into a database that is not required to be collected in the field. The draft Data Standard is focused on the marine environment. The draft Data Standard should be expanded to other environments (e.g., freshwater, Arctic). When using a line, the start and stop for the latitude and longitude should be included. Raw and post-processed data should be maintained and provided in data storage. Raw data should be more explicitly addressed in the draft Data Standard.

More guidance on data exchange formats should be added to the draft Data Standard. It is important to keep flexibility, however, the group noted that a small set of specified formats would be useful. Web services should also be included.

Data Handling

The group consisted of practitioners and SCAT customers and discussed (1) data sharing plan expectations and (2) the "SCAT package".

The group addressed elements of the data sharing plan as it applied during and after the response and what SCAT data is shared when, how and by whom. As a basis for its discussions, the group assumed that a data sharing plan had been created and signed by the UC.

During a response, there are several entities involved, including: Operations, Situation Unit Leader (SITL), Joint Information Center (JIC), Documentation Unit Leader (DOCL),

Environmental Unit Leader (EUL), Liaison Officer (LNO), agency leadership, and jurisdictional entities. Data sharing includes SCAT segment reports, STRs, and products (e.g., maps, photos) that are in a usable format (per the data model), for the customer. The data is generally shared after QA/QC and must be timely in order to support the operational response. When data is transferred depends on the product and the audience. Eventually all SCAT results are delivered to the Documentation Unit and NRDA, as appropriate. The Operational decision-making is dependent on availability of analytical SCAT products, derived from raw SCAT data. There are protocols on how to transfer data (e.g., FTP site, cloud, COP) which include version control and notification to customers regarding new data.

Post response, the entities that are signatories on the data sharing plan are involved in the data sharing. In addition to the type of data shared during a response (outline above), data sharing can also include the raw data. It is preferable if the data are transferred the same way post-response as during the response. Similar to during the response, all SCAT results are eventually delivered to the Documentation Unit and NRDA.

There is no single definition for "SCAT data package", although the data sharing plan may define specific components. The SCAT data package can consist of the raw data, products and the QA/QC status. Products may include dashboard, maps, segment reports, STRs, georeferenced photos/videos. QA/QC status consists of provisional information (e.g., oiled wildlife) which could be shared with appropriate customers, and confidence statements describing where the information is in the QA/QC process. The QA/QC status varies with who is using the data. Products and data sharing might evolve over during the incident.

QA/QC and Data Flow

The group consisted of SCAT coordinators and discussed (1) data and product quality review and approval in the workflow process, (2) future workflows, and (3) SCAT products and timing of production.

In regards to the workflow process, the Team Lead oversees field data collection, whether it is paper or digital, and is responsible for data quality. In larger incidents, the field teams are not responsible for

SCAT product development. The Data Team is responsible for completeness. The SCAT Coordinator and SCAT Data Manager oversee and review the content. There could be a built-in electronic QA component in new SCAT data management systems, QA/QC needs to be more explicit for digital SCAT (e.g., flag data management system to track changes or corrections); while it was previously implicit with paper. QA/QC is done before the product is developed.

For future workflows, it is important to have experienced people on the team to ensure quality data and products in the process. The team QAs data prior to its submission, and checks for completeness and accuracy are performed by the data manager. New SCAT data management systems should have the Team Lead QC input and again post-upload. The SCAT Coordinator performs high-level checks to assure data quality, content and that the consistency is correct. There is a need for QA of processed field data and products.

A SCAT daily report (i.e., including a text summary, identification of oil, SCAT location for the next day) can, and should, be aligned with the planning cycle. The IC may be on a 24-hour action plan, but SCAT STR's may not be developed and approved in that time frame. Management expectations for the timing of SCAT products can be unrealistic and there is a risk of producing preliminary products that are not accurate. There is a need for flexibility on how to reach SCAT objectives through data generation. There may be early feedback products that can be pre-identified (e.g., heavy or light oiling). It is important to recognize that the use of electronic data collection may not necessarily lead to faster product development. Further, end users need to recognize that these products can change. There is a need to communicate change in a SCAT product within the content of the Incident Action Plan.

Best Practices

In the second breakout session, each group discussed best practices which were further refined during the subsequent plenary session.

Best Practices for the Data Standard

- The Data Standard is the best practice. If you have additional information besides the types covered in the Data Standard, it should be well documented and follow in similar format.
- Draft Data Standard is focused on marine environments with respect to NOAA's interest. Recommendation: "de-marine" the Data Standard to other environments (e.g., freshwater, Arctic). Examples of these forms have been developed (e.g., Canada).
- Metadata: Documentation should be provided of how the data was post-processed so "reverse engineering" is not needed to determine this. Recommendation: Add processing information into the documentation; additional attributes should match the field name descriptions; related files/links.
- Segments: Keep versions/documentation and add the start and stop date of when the geometry for that segment was created/used to accommodate segments that may change over time
- Latitude/Longitude: Add start and stop latitude/longitude for a line. Currently, there are not explicit fields for latitude/longitude).

- Data Strategies: Maintain and provide data storage for raw and post-processed data. Address raw data more explicitly in the Data Standard.
- Data Exchange Formats: Add more guidance by refining the list of specified file formats to the standard, but keep flexibility.
- Data Services: Include/reference the topic of web data services for the delivery and exchange of data for export. This might be added to the Data Standard as one of the acceptable ways to deliver data.
- Completion Notation: Identify the completion flags/elements/process/tracking for QA/QC status in the Data Standard. A minimum, check flags by SCAT Field Team Lead, SCAT Data Manager, and SCAT Coordinator.

Best Practices for QA/QC and Data Flow

- Manage expectations through explicit list of products and delivery time table for each product as part of the SCAT Plan, endorsed by the Unified Command.
    - Recognize phase transition in the SCAT process (e.g., recon/bulk oil removal, systematic /STR, inspection/SIR).
    - Recognize the products and timeline may change through the different phases.
    - Be able to scale (scalability/flexibility) the SCAT program based on size and complexity of event.
    - Recognize SCAT Coordinator has ultimate QA/QC responsibility and delegates this according to scale.
- Make QA/QC more explicit. Currently, it is implicit (this is related to Best Practices for the Data Standard regarding Metadata). Steps include:
    - Built-in QA in electronic system (the inherent QA built into the electronic data entry) must remain flexible and not prevent collection of data.
    - Requirement to flag the data management system and track any changes or corrections.
    - Required review on both ends of any transition between electronic field data collection and office data management system to insure data is not corrupted in transition/upload.
    - QA/QC done before a product is developed.
- Insure multi-stage QA/QC:
    - SCAT Field Team Lead is responsible for data quality (quantitative).
        - SCAT Field Team Lead must oversee data (whether it is paper or digital). This has verbal component/interaction. It addresses the data entry process.
    - SCAT Data Manager is responsible for completeness and logical consistency.
        - SCAT Data Manager insures the accuracy of the data uploaded and addresses missing information.
    - SCAT Coordinator oversees/reviews the content entered.
- Identify the completion flags/elements/process/tracking for QA/QC status in the Data Standard.

Best Practices for Data Handling and Exercise Development

Data Handling Best Practices

- There is only one data submission from a SCAT Field Team per survey (paper or electronic).
- SCAT Field Team Leads should be competent/experienced and understand the paper vs. electronic data capture transition.
- If electronic field data collection tools are being used, at least one team member should be competent in those applications.
- Until electronic field data collections systems are operational, hard copy field data must still be collected as a backup.
- SCAT Data Managers should be competent/experienced.
- SCAT Field Team Leads, SCAT Data Managers and SCAT Coordinators need time to perform adequate verification of day's products/data.

Exercise Development Best Practices

- There are templates for data sharing plans that can be used (See Appendix G).
- In order to support SCAT in exercises, there must be adequate "Truth" documentation prepared in advance.
    - Most drills operate 0-48 hr, but to exercise SCAT, drills must be longer or simulate a longer period.
    - To be effective, there must be adequate staffing for SCAT.
    - Exercise SCAT drill data must be complete and developed ahead of time.
- Data sharing (including SCAT data) should be an objective in exercise(s).
- During exercises, a realistic time line for SCAT products must be provided.
    - Develop estimates of time line for SCAT data products (e.g., using NOAA SCAT manual).
- The interoperability of SCAT tools should be tested in exercises.
- Lessons learned regarding SCAT data management must be captured and shared (e.g., RRTs, area committees).
    - A template for this could be the processes used when ERMA was developed as the COP. Similar lessons learned could be applied to SCAT (N.B., States are a key players.).

Path Forward and Conclusion

The Best Practices and Path Forward addressed the current concerns regarding electronic data management for SCAT in oil spills, evaluated the future needs, and provided next steps for the SCAT community. The workshop concluded with a plenary discussion of the path forward. Participants were asked:

What would you consider 'metrics of success' with respect to the outcomes discussed at this workshop within six months, one year, and three years?

Six months:

- Highest priority: Establish a structure on who and how participants will continue to meet regarding the SCAT for the future (e.g., workshop, working group, offline, joint industry, meeting on SCAT at Clean Gulf, AMOP).
- Revise the draft Data Standard and post for agency and industry access.
- Develop a communication strategy to educate and manage expectations of Incident Managers, state representatives, RRTs, other user groups (e.g., NRDA) regarding the draft Data Standard and data sharing. Provide information before a drill.
- Make SCAT data explicit to information workflow, including the QA/QC checks, with proposed time frames for products focused for SCAT coordinators and management teams, as well as for the communication strategy. This is internal to SCAT Coordinators.

One year:

- Incorporate SCAT data management in an appropriate exercise implementing workshop outcomes.
    - Incorporate electronic data capture mobile app, e.g., starting Day 5 (SCAT Teams already in place).
    - Incorporate the new Data Standard, QA/QC, data flow, data sharing.

Three years:

- Support of the Data Standard: Incorporate it within SCAT data management tools and field data collection tools.
- Include SCAT data management as part of American Society for Testing and Materials (ASTM) International.
- Incorporate best practices in the NOAA Shoreline Assessment Manual.

The workshop provided the opportunity for feedback from stakeholders on the draft NOAA Data Standard and data sharing agreement strategies regarding SCAT.

Addendum:

A SCAT for Tomorrow meeting was held in conjunction with IOSC 2017 (May 17, 2017, Long Beach, CA). The SCAT organizing committee gave updates on the Data Standard and the status of future activities. The following are the major outcomes of that meeting:

- A revised draft NOAA SCAT Data Management Standard incorporating suggestions from the May meeting has been completed per workshop attendee suggestions.
- Another SCAT for Tomorrow meeting will be held at Clean Gulf in December 2017.
- Working Groups will be convened to continue work on SCAT for Tomorrow.

Appendix

Appendix A: Participant List

Appendix B: Draft NOAA SCAT Digital Data Standard

Appendix C: Workshop Agenda

Appendix D: Plenary and Panel Presentation Slides

Appendix E: List of Breakout Groups

Appendix F: Breakout Session Notes

Appendix G: Data Sharing Plan Templates

SCAT for Tomorrow Workshop

APPENDIX

January 18-19, 2017

NOAA's Gulf of Mexico Disaster Response Center

Mobile, AL

Workshop Report - Appendix

Coastal Response Research Center

Appendix

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Appendix A: Participant List

SCAT FOR TOMORROW WORKSHOP

JANUARY 18 – 19, 2017

PARTICIPANT LIST

Steve Alexander
U.S Fish & Wildlife Service
steven_alexander@fws.gov

Jeff Arnett
Shell Exploration & Production Co.
Geomatics & Data Management
jeff.arnett@shell.com

Steve Buschang
Texas General Land Office
steve.buschang@glo.texas.gov

Carl Childs*
NOAA ORR Emergency Response Division
carl.childs@noaa.gov

Marty Cramer
ConocoPhillips
martin.a.cramer@conocophillips.com

Judson Crouch
TRG
jcrouch@resonsegroupinc.com

Richard Davi
ExxonMobil
richard.a.davi@exxonmobil.com

Brady Davis
Center for Toxicology & Environmental Health
bdavis@cteh.com

Kate Doiron
Industrial Economics, Inc
kdoiron@indecon.com

Stephan Gmur
Polaris
sgmur@polarisappliedsciences.com

Dominique Goyer
TRIOX Environmental Emergencies
dominique.goyer@triox.ca

Michael Greer
Genwest
michael.greer@noaa.gov

CMDR JoAnne Hanson
U.S. Coast Guard, Gulf Strike Team
joanne.n.hanson@uscg.mil

Whitney Hauer*
Coastal Response Research Center, UNH
whitney.hauer@unh.edu

Charlie Henry*
NOAA ORR
Gulf of Mexico Disaster Response Ctr
charlie.henry@noaa.gov

Rob Holland
Oil Spill Response Limited
robholland@oilspillresponse.com

JB Huyett
Genwest
jb.huyett@noaa.gov

Michele Jacobi*
NOAA ORR
michele.jacobi@noaa.gov

Nancy Kinner*
Coastal Response Research Center, UNH
nancy.kinner@unh.edu

Kenneth Kumenius (remote presentation only)
SCATMAN
kenneth@scatman.fi

Alain LaMarche
TRIOX Environmental Emergencies
alain.lamarche@triox.ca

Sonja Larson
Washington State Dept of Ecology
slar461@ecy.wa.gov

Stephane Leblanc
Environment Canada
stephane.leblanc3@canada.ca

Chris Locke
Research Planning, Inc
clocke@researchplanning.com

*Denotes Workshop Organizing Committee Member

Kathy Mandsager*
Coastal Response Research Center, UNH
kathy.mandsager@unh.edu

Chief Sheridan McClellan
U.S. Coast Guard
sheridan.b.mcclellan@uscg.mil

Andrew Milanes
Environmental Science Services, Inc.
amilanes@es2-inc.com

Mark Miller*
NOAA ORR, Emergency Response Division
mark.w.miller@noaa.gov

Judd Muskat
California Ofc of Spill Prevention & Response
judd.muskat@wildlife.ca.gov

Guillaume Nepveu
CHAAC Technologies
guillaume.nepveu@coralmobile.net

Zach Nixon*
Research Planning, Inc
znixon@researchplanning.com

Isaac Oshima
California Ofc of Spill Prevention & Response
isaac.oshima@wildlife.ca.gov

Ed Owens
Owens Coastal Consultants Ltd
eowensocc@aol.com

David Palandro
ExxonMobil
david.a.palandro@exxonmobil.com

Chris Pfeifer
CARDNO
chris.pfeifer@cardno.com

Florence Poncet
CEDRE
florence.poncet@cedre.fr

Kenny Rhame
The Response Group, Inc
krhame@responsegroupinc.com

Timyn Rice
Florida Fish & Wildlife Conservation Commission
timyn.rice@myfwc.com

Ben Shorr*
NOAA ORR Asessment & Restoration Division
benjamin.shorr@noaa.gov

Robert Simmons
Environmental Science Services, Inc.
rsimmons@es2-inc.com

Marla Steinhoff
NOAA ORR Asessment & Restoration Division
marla.steinhoff@noaa.gov

Elliott Taylor
Polaris
etaylor@polarisappliedsciences.com

John Tarpley*
NOAA ORR Emergency Response Division
john.tarpley@noaa.gov

Kathleen Thomas
Chevron
kathleen.thomas@chevron.com

David Wesley*
NOAA ORR Emergency Response Division
david.wesley@noaa.gov

Caitlin Wessel
NOAA Gulf of Mexico Marine Debris
caitlin.wessel@noaa.gov

Dan White
Center for Toxiciology & Environmental Health
dwhite@cteh.com

Mark Whittington
The International Tanker Owners Pollution Federation Limited (ITOPF)
markwhittington@itopf.com

Robb Wright
NOAA ORR Asessment & Restoration Division
robb.wright@noaa.gov

Scott Zengel
Research Planning, Inc
szengel@researchplanning.com

*Denotes Workshop Organizing Committee Member

Appendix B: Draft NOAA SCAT Digital Data Standard

Shoreline Cleanup Assessment Technique (SCAT) Digital Data Standard – Draft

12/2016

Purpose

This document describes a proposed data standard for observational Shoreline Cleanup Assessment Technique (SCAT) data collected by field survey teams during oil spills and similar incidents to evaluate shoreline oiling, recommend and guide treatment, and document compliance with cleanup endpoints. The volume of data collected and developed during oil spill response is growing at an ever increasing rate. This places a substantial burden on the response to be able to rapidly digest and interpret those data to inform operational decision making. This growth in the data management workload has been facilitated by the rapid evolution of electronic field data collection tools, data storage systems and common operational displays. Absent a common vision for how these systems will work together, these tools will be unable to provide a pathway to distill these data and translate them into operationally meaningful information.

This draft standard was developed by the National Oceanic and Atmospheric Administration (NOAA) Office of Response and Restoration (OR&R), Emergency Response Division (ERD). While there are a variety of SCAT or similar protocols and processes that exist (CEDRE, 2006; MCA, 2007; Owens and Sergy, 2000; Owens and Sergy 2004), this standard is intended to support the storage and manipulation of data to support the SCAT process as described in the NOAA Shoreline Assessment Manual (NOAA, 2013). This standard is provided to the response community as a common point of reference in the development of electronic field data collection tools, databases and information products for SCAT activities. This is a voluntary standard that will be maintained and updated by NOAA based on input from the response community and the evolution of new technologies.

The draft data standard proposed here includes:

1. A conceptual data model, consisting of a set of proposed entities and relationships,
2. Rules for spatial representation of these entities,
3. Required core tabular attributes describing these entities,
4. Required spatial relationships and logical relationships between entities, and
5. Minimum documentation requirements.

This proposed data standard does not include mandatory logical data model (a set of explicitly required normalized tables, attributes, and relationships) for use in Geographic Information (GIS) or Relational Database Management System (RDBMS) software, though it does suggest these via higher-level concepts. The spatial and attribute data required by the standard are not intended as the entirety of a fully articulated logical data model or database structure. It is expected that databases, applications, or other tools that are used to maintain data compliant with this standard will each have design requirements that require a specific logical model, or a more complex or normalized database structure. In short, the standard is a *standard for a data model*, not a database, database design, or a spatial data storage model.

In addition, the standard is intended to support data management for SCAT carried out for the simplest spill that would require management of digital SCAT data. Data managers may need to extend the standard (and associated logical schema or data model) to include additional conceptual entities (e.g. shoreline cleanup status categories), spatial features, tables, or attributes required for a more complex incident, or adapt to incident-specific requirements. Lastly this standard does not address all the tasks required as part of SCAT data management (see Lamarche et al., 2007; NOAA, 2013). This standard only describes the required components for formal structured data that are collected by full SCAT teams. Data collected by pre-spill surveys, reconnaissance, field photography, special surveys, or to support administrative status tracking are all generally managed by SCAT data management teams, but these data can be highly spill-specific and are not within the scope of this standard.

Conceptual Data Model

The standard includes a few core conceptual entities, described below, including shorelines, segments, surveys, surface oil observations, subsurface oil observations and treatment recommendations (Figure 1). These entities describe general classes of data collected and managed by SCAT.

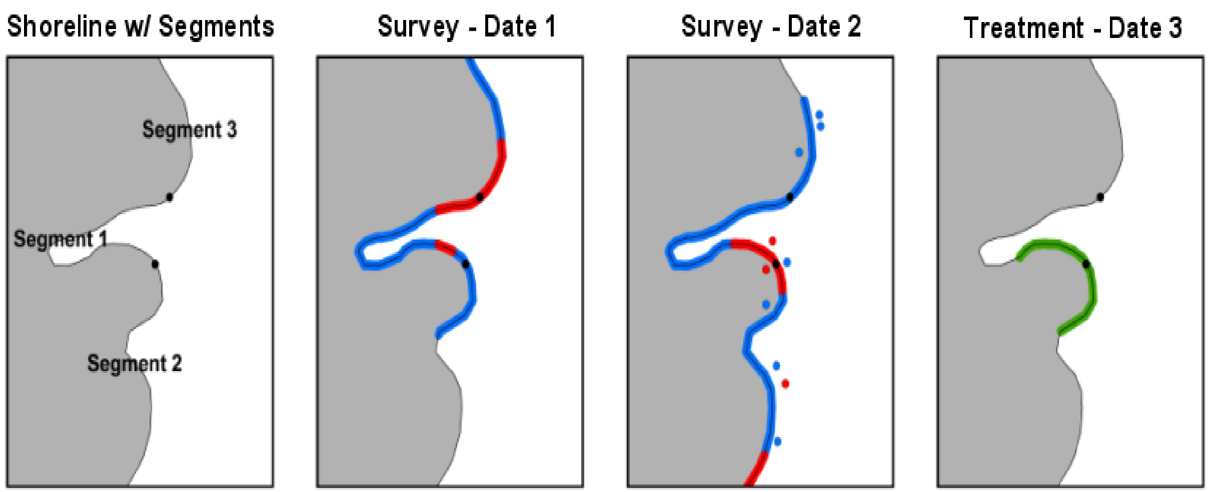

Figure 1. Schematic of spatial relationships among conceptual entities over time showing a shoreline partitioned into segments. SOOs from a survey on Dates 1 and 2 are depicted as blue and red lines coincident with the shoreline for No Oiling Observed and Oiled SOOs respectively. SSOOs from Date 2 are depicted as red and blue points in the vicinity of the shoreline for No Oiling Observed and Oiled SOOs respectively. The extent of an STR on Date 3 is depicted as a green line coincident with the shoreline.

Shoreline Representation

Shorelines are intertidal, fluvial, or lacustrine environments where the land-water interface often changes in position and extent over both long and short time-scales. In order to accurately compare SCAT field data from multiple surveys at a single location it is necessary to reference these observations using a single digital shoreline representation. Shorelines representations are fixed, spatially unchanging extents of shoreline habitat. These may be derived from existing spatial data before a spill occurs or it may be necessary generate the Shoreline Representation after an incident has occurred. Shorelines are typically represented as a one-dimensional digital vector line, but may be represented as polygons (complex wetlands or floodplains) or, rarely, points. If a spill event persists for long enough, shoreline representations may move or change in morphology.

Segments

Shoreline segments are relatively fixed, spatially unchanging subsets of a shoreline representation that are used operationally during a spill response to reference specific portions of a shoreline. These may be predefined before surveys take place, or even before a spill occurs; however, they can also be determined in the field by SCAT teams as they conduct initial surveys. Optimally, segments have consistent geomorphic, physical, and administrative characteristics and are fixed in space. If a spill event persists for long enough, segments may move or change in morphology either as a function of change in their parent shoreline representation or within/along an unchanged parent shoreline representation for operational or administrative reasons. Segments are unique and non-overlapping in space at a given point in time. A segment must be a child element of a shoreline representation.

Surveys

A survey is atime-specific assessment of the oiling conditions along some subset of a shoreline representation. Surveys may or may not cover the entire length of one or more specific segments. Surveys may describe shoreline surveyed by SCAT teams on foot or observed remotely from vessels or aircraft, and do not necessarily represent areas physically occupied by SCAT teams. Surface and subsurface oiling observations made by field teams on a specific survey are child elements of that survey. A survey has no spatial extent beyond those child elements and is thus defined by the aggregate of the spatial extents of those child elements. Surveys may overlap in space and time. Surveys are associated with structured data such as the date, time and location of the survey as well as a list of the SCAT team members and a formalized generic description of the survey area (see Table 2 below and sections 1-5 of the Shoreline Oil Summary form in Appendix A).

Surface Oiling Observation (SOO)

SOOs (commonly termed oiling zones, where no observed oil is a type of oiling zone) are survey and time-specific representations of consistent observed surface oiling and other shoreline characteristics. SOOs are commonly referenced by start and end points (collected as GPS way points) of the oiling zone along with a description of the oiling characteristics using the SCAT methodology. These start-stop points are matched to the Shoreline

Representation discussed above to comply with the topological requirements described in the following sections. This feature matching may be done at the time of data collection or via post-processing. Structured data associated with SOOs contain an across-shore width scalar value and a tidal elevation, but all SOOs that overlap along-shore are typically referenced as separate linear features that are all coincident with the shoreline. In some circumstances it may be necessary to represent SOOs as polygonal features (e.g. complex wetlands or floodplains) or points. Unless this is required to support unique operational considerations however, it is recommended that SOOs be represented as linear features along a linear shoreline representation. SOOs may potentially overlap in space (different tidal zones along the same shoreline) and time. See Table 3 below and sections 6 of the Shoreline Oil Summary form in Appendix A for structured data associated with SOOs.

Subsurface Oiling Observation (SSOO)

SSOOs are survey and time-specific representations of observed subsurface oiling and other shoreline characteristics. SSOOs are generally explicitly referenced with a single zero-dimensional point together with one or more scalar depth values where oiling was investigated in the field by excavation of a pit, trench, or core. As with SOOs, SSOOs may occasionally be referenced as polygons or lines but this is not recommended unless dictated by operational requirements. SSOOs may potentially overlap in space and time – though generally this will not occur if represented by zero-dimensional points. All SSOOs must be a child element of a survey. See Table 4 below and sections 7 of the Shoreline Oil Summary form in Appendix A for structured data associated with SOOs.

Shoreline Treatment Recommendations (STR)

STRs are time-period-specific recommended cleanup actions prescribed/permitted for a given location. This location can either be defined by a spatial entity (e.g., a linear or polygonal feature) specific to the STR, or by referencing the spatial geometry of other entities. For example, the location of an STR could be the extent of a specific SSO or set of SSOs from a specific survey, or the entirety of a certain segment.

Required Spatial Data

Specific conceptual entities must have explicit and unique spatial representation as independent vector geometry for use and analysis in GIS software or web mapping applications. At minimum, these include:

- Shoreline Representation
- Segments
- Surface Oiling Observations (SOOs or oiling zones)
- Subsurface Oiling Observations (SSOOs or pits)

Other conceptual entities are also required to have spatial representations, but these do not necessarily have to be stored explicitly as independent vector geometry. Instead, they may be stored as lists or lookup tables into other entities that do have explicit geometry.

These entities include:

- Surveys
- Shoreline Treatment Recommendations

Figure 2 is schematic of entities and their required spatial relationships over time. Surveys are required to have spatial extents consisting only of their children surface and subsurface shoreline observations. STRs may have spatial extents defined by one or more SOOs or SSOOs, one or more segments, or some other portion of a shoreline representation, or some other spatial extent. If an STR may be uniquely defined by reference to other entities, then it can be spatially represented by a non-spatial list of these other features. If an STR has a spatial extent that cannot be uniquely defined by one or more SOOs, SSOOs, or segments, then it must be represented by explicit vector geometry.

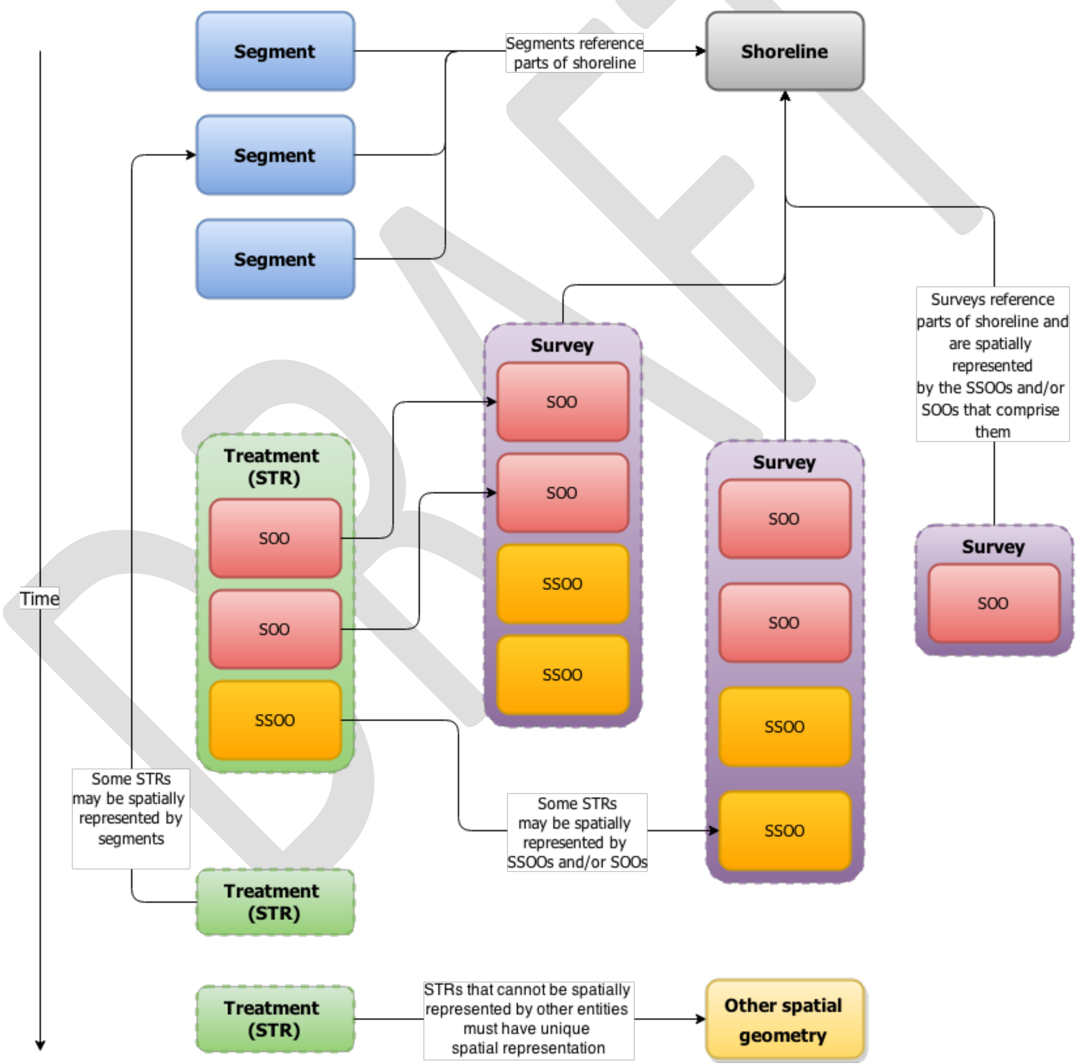

Figure 2. Schematic of logical relationships among conceptual entities over time. Entities with solid outlines are have unique individual spatial representations. Entities with dashed outlines have spatial extents defined by the spatial representations of other entities.

Required Spatial Topology

Topology, defined here as the properties of geometric features in two dimensions, is a way to define and explicitly test for properties like adjacency, connectivity, proximity, and coincidence. Certain topological relationships are required by the standard for features with polygonal and linear spatial representations. These relationships are referenced in the descriptions of conceptual entities above. Most importantly, it is required that all linear surface oiling representations (zones) must be coincident with the linear shoreline representation. If any other entities such as subsurface oiling representations, shoreline treatment recommendations, or other entities are represented as linear features, these must also be coincident with the linear shoreline representation. This standard makes reference to spatial relationships described in the DE-9IM model (Clementini et al., 1993; Egenhoffer and Franzosa, 1991) which is implemented in standard GIS software and spatial databases.

The standard requires that these topological relationships exist, but does not have any requirements for how or when these relationships are enforced. For example, raw spatial data (e.g. field collected coordinates) or interim analysis products stored within a GIS or RDBMS software system are not required to comply with these topological rules. However, the standard does require that topologically compliant data is either: 1.) automatically or regularly generated as part of such software systems and associated data management processes, or 2.) is readily and simply generated when generating data for export or interchange. For example, a survey team might record the location of a linear SOO (zone) using a GPS device that records points that are not coincident with the shoreline representation. Storage of these raw coordinate data is acceptable and encouraged. To generate data compliant with this standard, however, these raw coordinates must be made topologically correct by "snapping" these coordinates to the shoreline representation and generating linear features that comply with the rules below.

The standard requires the following topological relationships:

- All linear features must not self-cross or self-overlap (e.g. must be simple and not complex).
- All linear features must overlap with a linear shoreline if the relevant shoreline is represented linearly and not polygonally.
- Linear features must not cross other linear features of the same type but may overlap other linear features of the same type.
- Linear and polygonal features with multiple parts (e.g. multipart features or collections of features with the same geometry type) are permitted but not required.
- All spatial features must be covered by a polygonal shoreline, intertidal zone, or potentially oiled area if such a feature exists (features may lie exactly on the boundary of a polygonal shoreline, but may not extend beyond)
- Polygonal features may have interior holes, but multipart polygonal features may not have parts contained in interior holes in that feature. These "islands" must be represented as separate spatial features.

See figures 3-6 below for illustrative examples.

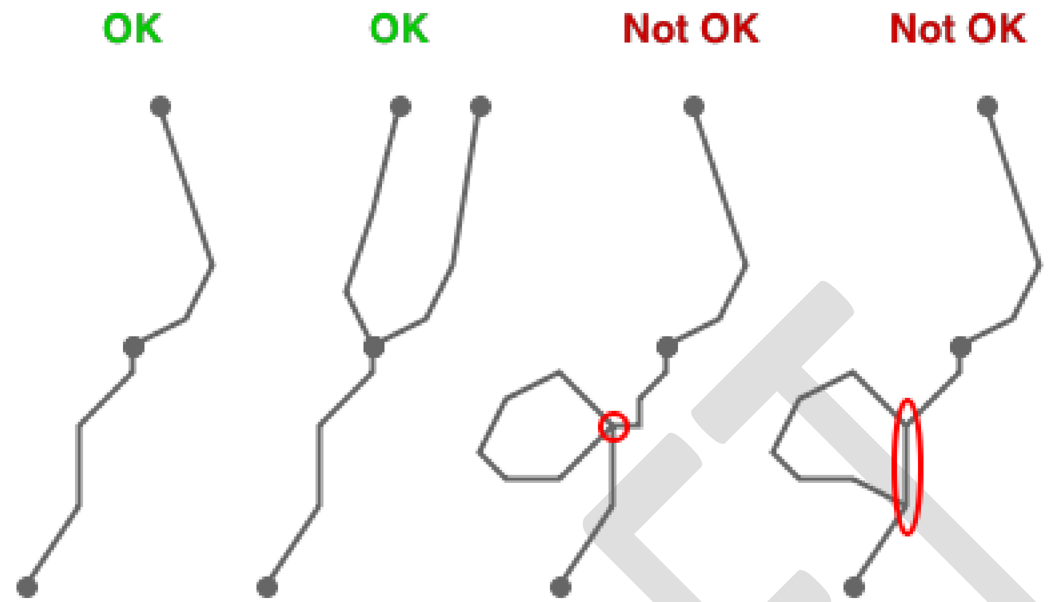

Figure 3. Linear features may intersect other linear features at endpoints but may not self-cross, or self-overlap. Linear feature endpoints depicted as dots, whereas feature vertices are not depicted.

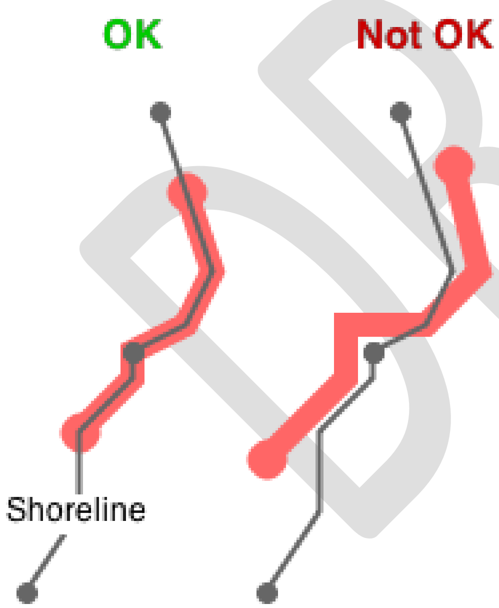

Figure 4. All non-shoreline linear features must overlap linear shoreline features

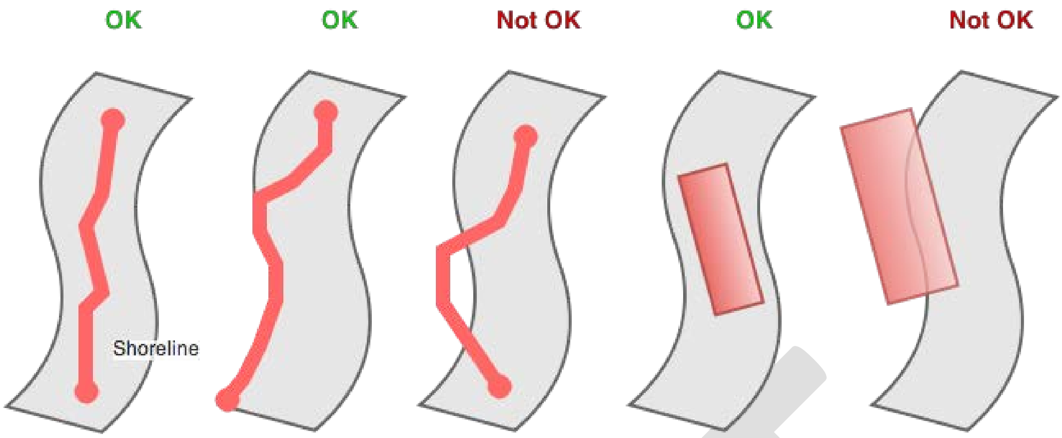

Figure 5. All non-shoreline spatial features must be covered by polygonal shoreline features (lie in the interior or along the boundary of the polygonal shoreline feature) if such features exist.

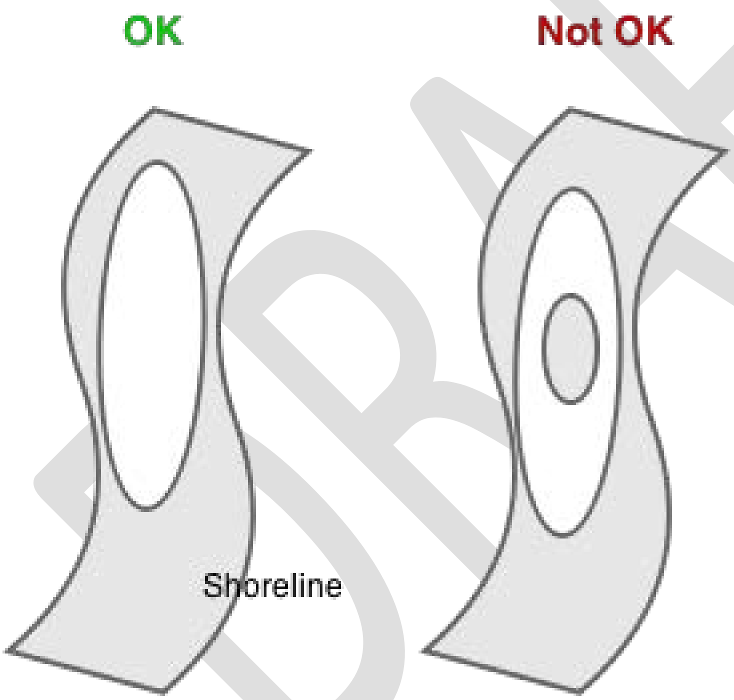

Figure 6. All polygonal shoreline features may have interior holes, but multipart polygonal features may not have parts contained within interior holes (i.e., cannot have an "island" within a hole).

All of these relationships are enforceable and testable in most commercial or open-source vector-based GIS, spatially enabled database software packages, or topology libraries including ArcGIS, Quantum GIS, Oracle Spatial, PostGIS, Java Topology Suite (JTS), and others.

Required Tabular Attributes

This standard includes a set of core attributes for each conceptual entity represented in a data table. These are listed in the tables below. For entities that require explicit spatial representation, these may be stored in a format that combines spatial and attribute information, or in data tables that are separate from spatial information. NOAA recognizes that each incident presents unique challenges and requirements, so it is anticipated and desirable that this standard may be extended. Data managers and spill response personnel are free to add additional fields to store additional or more specific information, though the field specified in the tables below are mandatory. Additional codes may be added to the codesets specified below where required to record different or event-specific conditions. This standard requires only that any such changes be included in accompanying documentation or metadata (see the Metadata section below). Different GIS and database software packages may have different requirements and conventions regarding field naming. As such, the field names included below are intended as suggested field names only. Data managers are free to adopt field names suitable for use in the specific software packages in use during a response. Field names should be fully annotated in accompanying metadata, and compliant with the following criteria:

- Should begin with alphabetical characters.
- Should not include spaces, dashes, or special characters other than underscores.
- Should avoid unmodified words commonly reserved by GIS or RDMS software systems or programming constructs, such as "date", "order", "file", "range", "loop", "by" etc. For example, "date" is unacceptable as a field name, but "obs_date" is acceptable.
- Should be limited to 10 characters where possible to meet limitations of the ESRI shapefile format.
- Should be human-readable where possible.

Note that certain attributes of surveys, Surface Oiling Observations (SSOs) or oiling zones, and Subsurface Oiling Observations (SSOOs) are always required to be collected in the field at the time of survey, while other attributes may be assigned after the fact, or programmatically by data collection or storage software. These attributes are indicated in a separate column for the relevant conceptual entities in the tables below. Raw or field collected data consisting of hardcopy or scanned forms or electronically collected SCAT field data in any format must include this subset of tabular attributes for these conceptual entities to be compliant with this standard.

Table 1. Required tabular attributes for segments. No segment related data is required to be collected in the field, though this is possible and permitted.

Attribute	Description	Suggested Field Name	Type	Codeset or valid values
Segment ID	Unique identifier	SEG_ID	Text	Alphanumeric text string containing identifier sufficient to uniquely identify segment
Primary ESI	Primary ESI type of segment	ESI_PRIM	Text - Codeset	See NOAA, 2003.
Secondary ESI	Secondary ESI types present along segment	ESI_SEC	Text - Codeset	See NOAA, 2003. If required, additional fields required to hold additional secondary codes
Backshore type	Boolean indicator of presence of cliff/slope	BACK_CLIFF	Boolean	T/F
Backshore type	Boolean indicator of presence of lowland	BACK_LOW	Boolean	T/F
Backshore type	Boolean indicator of presence of beach	BACK_BEACH	Boolean	T/F
Backshore type	Boolean indicator of presence of Dune	BACK_DUNE	Boolean	T/F
Backshore type	Boolean indicator of presence of wetland	BACK_WETL	Boolean	T/F
Backshore type	Boolean indicator of presence of lagoon	BACK_LAG	Boolean	T/F
Backshore type	Boolean indicator of presence of delta	BACK_DELTA	Boolean	T/F
Backshore type	Boolean indicator of presence of channel	BACK_CHAN	Boolean	T/F
Backshore type	Boolean indicator of presence of manmade	BACK_MAN	Boolean	T/F
Backshore Access	Boolean indicator of presence of access from backshore	ACC_BACK	Boolean	T/F
Alongshore Access	Boolean indicator of presence of alongshore access	ACC_ALONG	Boolean	T/F
Backshore Staging	Boolean indicator of presence of backshore staging areas	STAGE_BACK	Boolean	T/F
Access Description/ Restrictions	Access description	ACC_DESC	Text	Text description of access and access restrictions

Table 2. Required tabular attributes for Surveys. Attributes required to be collected in the field via form or electronic data collection indicated.

Attribute	Field Req'd	Description	Suggested Field Name	Type	Codeset or valid values
Survey ID	No	Unique identifier	SURV_ID	Text	Alphanumeric text string containing identifier sufficient to uniquely identify survey within and across dates
Survey Date	Yes	Date of start	SURV_DATE	Date	Valid date in local time zone
Survey Start Time	Yes	Time of survey start	START_TIME	Time	Valid time in local time zone
Survey Stop Time	Yes	Time of survey end	STOP_TIME	Time	Valid time in local time zone
Tide Height	Yes	Primary tide height for period of survey	TIDE_HGT	Text - Codeset	Codes: L;M;H
Survey By	Yes	Personnel conducting survey	SURV_PER1	Text	Name and organization of first team member conducting survey. Though not required by standard, this should be pulled from lookup table. Multiple fields required to hold unknown count of multiple values.
Survey By	Yes		SURV_PER2	Text	See above.
Survey By	Yes		SURV_PER3	Text	See above.
Survey By	Yes		SURV_PER4	Text	See above.
Survey By	Yes		SURV_PER5	Text	See above.
Survey By	Yes		SURV_PER6	Text	See above.
Segments	No	Segment(s) surveyed	SEGMENTS	Text or Lookup Table	
Survey Method	Yes	Method used to conduct survey	SURV_TYPE	Text - Codeset	Codes: Foot; ATV; Airboat; Boat; Helicopter/Aircraft; Overlook

Table 3. Required tabular attributes for Surface Oiling Observations (SSOs) or oiling zones. Attributes required to be collected in the field via form or electronic data collection indicated.

Attribute	Field Req'd	Description	Suggested Field Name	Type	Codeset or valid values
Zone ID	No	Unique identifier	ZONE_ID	Text	Alphanumeric text string containing identifier sufficient to uniquely identify oiled zone within survey
Tidal Zone	Yes	Categorical descriptor for average/dominant elevation relative to tidal or other datum	TIDAL_ZONE	Text - Codeset	Codes: LI; MI; UI; SU; LI/MI; MI/UI; UI/SU; LI/MI/UI; LI/MI/UI/SU
Width	Yes	Average across-shore width of oiled zone in meters.	WIDTH	Numeric	Floating point values in meters. Zero values permitted only for NO observations.
Distribution	Yes	Average areal distribution of surface oil as percentage or ratio of substrate of oiled zone or categorical descriptor of same.	OIL_DIST	Numeric *OR* Text - Codeset	Floating point values as percentage or ratio. Zero values permitted only for NOO observations. Null values permitted only for observations with discrete oiling counts, unit areas, and sizes. May only be null for NO observations or only for observations with discrete oiling counts, unit areas, and sizes. Codes (if codeset used): C; B; P; S; T
Thickness	Yes	Average thickness of surface oil in cm or categorical descriptor of same	OIL_THICK	Numeric *OR* Text - Codeset	Floating point values in cm. Zero values permitted only for NO observations. Null or blank values permitted only for observations with discrete oiling counts, unit areas, and sizes. May only be null or blank for NO observations or only for observations with discrete oiling counts, unit areas, and sizes. Codes (if codeset used): TO; CV; CT; ST; FL

Attribute	Field Req'd	Description	Suggested Field Name	Type	Codeset or valid values
Character	Yes	Categorical descriptor of dominant oil character within oiled zone	OIL_CHAR	Text - Codeset	May only be null or blank only for observations with discrete oiling counts, unit areas, and sizes. Codes: FR; MS; TB; PT; TC; SR; AP; NO
Substrate	Yes	Categorical descriptor for location of surface oil (sediment/soil, vegetation canopy, or both)	SUBSTR	Text - Codeset	Null or blank values permitted only for NO observations. Codes: S;V;B
Discrete oiling count per unit area	Yes	Count per unit area of tarballs or residue balls in oiled zone	TB_CNT	Numeric	Integer values. Zero values permitted only for NO observations or observations with areal distribution and thickness as above.
Discrete oiling count unit area	Yes	Area of count of tarballs or residue balls in oiled zone	TB_AREA	Numeric	Floating point values. Zero, null or blank values permitted only for NO observations or observations with areal distribution and thickness as above.
Discrete oiling count unit area	Yes	Units area of count of tarballs or residue balls in oiled zone	TB_ARUNIT	Text - Codeset	Null or blank values permitted only for NO observations or observations with areal distribution and thickness as above. Codes: M2; M100; M; ZONE
Discrete oiling avg. size	Yes	Average planimetric diameter in cm of tarballs or residue balls in oiled zone.	TB_AVSIZE	Numeric	Floating point values in centimeters. Zero, null or blank values permitted only for NO observations or observations with areal distribution and thickness as above.
Discrete oiling large size	Yes	Largest planimetric diameter in cm of tarballs or residue balls in oiled zone.	TB_LGSIZE	Numeric	Floating point values in centimeters. Zero, null or blank values permitted only for NO observations or observations with areal distribution and thickness as above.

Attribute	Field Req'd	Description	Suggested Field Name	Type	Codeset or valid values
Type of discrete oiling	Yes	Dominant categorical descriptor of tarballs, residue balls or other discrete oiling within oiled zone	TB_TYPE	Text - Codeset	Null or blank values permitted only for NO observations or observations with areal distribution and thickness as above. Codes: F; E; S; W; R; O
Plant oiling bottom elevation	Yes	Average vertical elevation of lowest oiling on plant canopy in cm from sediment surface	P_OILBOT	Numeric	Floating point values in centimeters.
Plant oiling top elevation	Yes	Average vertical elevation of highest oiling on plant canopy in cm from sediment substrate	P_OILTOP	Numeric	Floating point values in centimeters. Zero values only permitted for NO or non-plant oiling observations (Substrate <> P or B).
ESI Type	Yes	ESI type	ESI	Text - Codeset	See See NOAA, 2003.
Category	No	Categorical descriptor of relative oiling intensity.	OIL_CAT	Text - Codeset	Computed. See NOAA, 2013.

Table 4. Required tabular attributes for Subsurface Oiling Observations (SSOOs). Attributes required to be collected in the field via form or electronic data collection indicated.

Attribute	Field Req'd	Description	Suggested Field Name	Type	Codeset or valid values
Pit ID	No	Unique identifier	PIT_ID	Text	Alphanumeric text string containing identifier sufficient to uniquely identify pit, trench, or core within survey
Tidal Zone	Yes	Categorical descriptor for average/dominant elevation relative to tidal or other datum	TIDAL_ZONE	Text - Codeset	Codes: LITZ; MITZ; UITZ; SUTZ
Pit depth	Yes	Maximum depth of subsurface pit, trench or core in cm below sediment surface.	DEPTH	Numeric	Floating point values in centimeters. No zero values permitted.
Oiling top depth	Yes	Average depth of the top of observed subsurface oiling in cm below sediment surface.	OIL_TOP	Numeric	Floating point values in centimeters. Null or blank values only permitted for NO observations.
Oiling bottom depth	Yes	Average depth of the bottom of observed subsurface oiling in cm below sediment surface.	OIL_BOT	Numeric	Floating point values in centimeters. Zero, null or blank values permitted only for NO observations.
Character	Yes	Categorical descriptor of dominant oil character within oiled pit	OIL_CHAR	Text - Codeset	Null or blank values not permitted. Codes: SR; SAP; OP; PP; OR; OF; TR; NO
Distribution	Yes	Average areal distribution of subsurface oil within vertical oil interval as percentage or ratio of surface area in excavated pit, trench, or core or categorical descriptor of same.	OIL_DIST	Numeric *OR* Text - Codeset	Floating point values as percentage or ratio. Zero values permitted only for NOO observations. Codes (if codeset used): C; B; P; S; T
Depth to Water Table	Yes	Average depth of the bottom of observed water level in cm below sediment surface	WATER_DEP	Numeric	Floating point values in centimeters.

Attribute	Field Req'd	Description	Suggested Field Name	Type	Codeset or valid values
Sheen Color	Yes	Categorical descriptor of sheen on water table in pit, trench, or core if present	SHEEN	Text - Codeset	Codes: B; R; S; N
Clean Below	Yes	Boolean indicator of presence of clean sediment below oiled sediment	CLN_BELOW	Boolean	T/F
Category	No	Categorical descriptor of relative oiling intensity in pit	OIL_CAT	Text - Codeset	Computed. See NOAA, 2013

Table 5. Required tabular attributes for Shoreline Treatment Recommendations (STRs). No STR related data is required to be collected in the field, though this is possible and permitted.

Attribute	Description	Suggested Field Name	Type	Codeset or valid values
STR ID	Unique identifier	STR_ID	Text	Alphanumeric text string containing identifier sufficient to uniquely identify survey within and across dates
Surveys	Survey(s) wherein oiling that required treatment was observed	SURVEYS	Text or Lookup Table	Valid contents for either zones and surveys or segments is required to allow non-explicit spatial description of STR extents. Alternatively, if STRs are explicitly represented by spatial data, then these attributes may be omitted or blank.
Zones	Zone(s) wherein oiling that required treatment was observed	ZONES	Text or Lookup Table	Valid contents for either zones and surveys or segments is required to allow non-explicit spatial description of STR extents. Alternatively, if STRs are explicitly represented by spatial data, then these attributes may be omitted or blank.
Segments	Segment(s) wherein oiling that required treatment was observed	SEGMENTS	Text or Lookup Table	Valid contents for either zones and surveys or segments is required to allow non-explicit spatial description of STR extents. Alternatively, if STRs are explicitly represented by spatial data, then these attributes may be omitted or blank.
STR Issue Date	Date STR was issued as permit	STR_ISSUE	Date	Valid date in local time zone
STR Completion Date	Date STR was completed	STR_COMPL	Date	Valid date in local time zone
STR Replaced By	Superseding STR	STR_REPL	Text or lookup table	Either text or lookup table containing or pointing to one or more STR IDs that replaced or superseded if present.
Cleanup Recommendations	Recommended cleanup	STR_CLEANR	Text	Unstructured text
Staging / Logistics Constraints	Staging or logistical concerns or waste disposal issues	STR_STAGE	Text	Unstructured text

Attribute	Description	Suggested Field Name	Type	Codeset or valid values
Ecological Concerns	Ecological concerns for recommended cleanup	STR_ECOL	Text	Unstructured text
Cultural/Historical Concerns	Cultural/Historical concerns for recommended cleanup	STR_CULT	Text	Unstructured text
Safety Concerns	Safety concerns for recommended cleanup	STR_SFTY	Text	Unstructured text

Logical Relationships

In addition to spatial topological rules describing required relationships between spatial features, the standard includes requirements for logical relationships between records in data tables describing the entities involved and records in other data tables and spatial features. The standard has no requirements for how and when these logical relationships are enforced. Relationships may be enforced by rules declared as part of the logical schema of compliant databases, built into the applications that make use of these databases, or checked via Quality Assurance/Quality Control (QAQC) procedures. Briefly, this standard requires:

- All spatial features describing surface oiling representations (zones) or subsurface oiling representations (pits) should have one corresponding record in the data tables containing attributes for those features.
- All tabular records describing surface oiling representations (zones) or subsurface oiling representations (pits) should have one or more corresponding spatial features describing these entities.
- All tabular records describing surface oiling representations (zones) or subsurface oiling representations (pits) should have a parent record in the data table containing information about the survey in which the given observation was made.
- All tabular records describing surveys are required to have at least one child record in the data table containing information about surface oiling observations (zones) or subsurface oiling observations made in that survey.

Metadata

Documentation sufficient to allow users not participating in data collection or management during a spill event to understand and use SCAT data is a mandatory component of this standard. Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource (NISO, 2004). Because SCAT data have a spatial component by definition, geospatial metadata standards are most appropriate, but any of the following standards is acceptable:

- Federal Geospatial Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (FGDC, 1998)
- ISO 19115 (ISO, 2014)
- Project Open Data Metadata Schema v1.1 (POD, 2015)

See references for internet resources specific to each of these standards. Tools enabling rapid and semi-automated creation of compliant metadata, either as stand-alone software or integrated with commercial and open source GIS and database software packages, are widely available. Compliance with a specific metadata standard is encouraged but not mandatory under the SCAT data standard. Regardless of the metadata standard applied, documentation sufficient for other users to understand the content, scope, structure, logical relationships, field names and contents, and other important details is required.

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Appendix A – Example Shoreline Observation Form

Note that this form, by design, assumes that the user is surveying a single SCAT segment. This practice is *not* required by this data standard, though it is permitted.

SHORELINE OIL SUMMARY (SOS) FORM: ____________________ **Page**____ **of** _____

1. GENERAL INFORMATION	Date (dd/Month/yyyy) (please use month name)	Time (24h standard/daylight) (00:00 to 00:00)	Tide Height
Segment ID:			L / M / H
Segment Name:		____:____ to ____:____	Rising / Falling
Survey By: Foot /ATV/ Boat / Helicopter / Overlook / Other _______	Weather: Sun / Clouds / Fog / Rain / Snow / Windy / Calm		

2. SURVEY TEAM	Name	Organization	Name	Organization
Team Number				

3. SEGMENT	Total Length: m	Length Surveyed: m	Datum: WGS84
Survey Start GPS:	WP:	LAT: .	LONG: .
Survey End GPS:	WP:	LAT: .	LONG: .

4a. BACKSHORE CHARACTER: Indicate only ONE Primary type and ALL Secondary types

Cliff/Slope___ Lowland___ Beach___ Dune___ Wetland___ Lagoon___ Delta___ Channel___ Man-Made___: ___________

4b. ESI SHORELINE TYPE: Indicate only ONE Primary (P) and ANY Secondary (S) types. CIRCLE those oiled.

Primary:	Secondary:

5. OPERATIONAL FEATURES	Oiled Debris? Yes / No	Type:	Amount: (bags)
Direct backshore access? Yes / No	Alongshore access from next segment? Yes / No	Suitable for backshore staging? Yes / No	
Access Description / Restrictions:			

6. OILING DESCRIPTION: Indicate overlapping zones in different tidal zones by numbering them (e.g. A1, A2)

Zone ID	ESI Type	WP Start	WP End	Tidal Zone				Oil Cover						Oil Thickness					Oil Character							
								Zone Area		1-100%	<1%	Size														
				LI	MI	UI	SU	Length (m)	Width (m)	Distr. %	# per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No

7. SUBSURFACE OILING CONDITIONS: Format: Zone ID dash Trench Number in that Zone, e.g., "A-1, B-1, B-2"

Pit #	WP	Substrate Type Surface / Subsurface	Tidal Zone				Pit Depth (cm)	Oiled Interval (cm-cm)	Subsurface Oil Character										Water Table (cm)	Sheen Color B,R,S,N	Clean Below Yes / No
			LI	MI	UI	SU			OP	PP	OR	OF	TR	TB	SR	AP	NO	%			

8. COMMENTS: Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions

Sketch: Yes / No Photos: Yes / No Photo Numbers: (-) Photographer Name:

Appendix B - Data Interchange File Formats and Naming Conventions

To preserve flexibility required for storing data in different formats and manipulating data in different software packages, this standard does not specify explicit file names or formats. It is important however that file names follow a logical and documented naming convention. It is recommended that file names include an explicit date of generation. Further, file names should be compliant with the following criteria:

- Should begin with alphabetical characters.
- Should not include spaces, dashes, or special characters other than underscores.
- Should not include prefix or suffix for data type (e.g. "tbl" for table or "fc" for feature class).

This standard requires that all compliant spatial and associated tabular data must be stored or delivered in a widespread and commonly used commercial format or open-source, cross-platform format. The standard is agnostic regarding data storage and manipulation software, but compliant data must be either stored in one of the file formats described below (or similar alternative), or be able to be readily and simply converted/exported to a compliant file format to facilitate interchange.

Generally, spatial data should be stored or delivered in one of the following formats:

- ESRI Shapefile (.SHP)
- ESRI File Geodatabase (.GDB)
- ESRI Personal Geodatabase (.MDB)
- GeoJSON/TopoJSON
- Well-Known Text/Well-Known Binary (.WKT, .WKB)

Tabular data should be stored or delivered in one of the following formats:

- Tab-delimited or comma-separated text (.TXT, .TAB, or .CSV)
- DBase (.DBF)
- Microsoft Access (.MDB)
- Microsoft Excel (.XLS, .XLSX)

File formats such as .AI, .EPS/.PS, .PDF and/or .PSD created from graphics editing applications such as Adobe Illustrator, Adobe Photoshop, Adobe Acrobat or other image generating applications or drivers are not acceptable. Similarly, data in file formats such as .DXF or .DWG from Computer Aided Design (CAD) applications are also not compliant with this standard.

Text should be encoded using the UTF-8 Unicode encoding standard if the internal Unicode encoding is not otherwise specified.

Appendix C: Workshop Agenda

SCAT FOR TOMORROW WORKSHOP

ORGANIZING COMMITTEE MEETING

AGENDA

Specific objectives of the workshop include:

- Assessment of current concerns regarding electronic data management for SCAT in oil spills;
- Evaluation of future needs for SCAT to improve readiness and efficiency;
- Definition of key data standards and data exchange formats to allow better management and sharing of SCAT data for response and Natural Resource Damage Assessment (NRDA); and
- Feedback from stakeholders on NOAA's draft data standard and data sharing agreement strategies regarding SCAT.

Wednesday, January 18, 2017:

800 Registration

830 Welcome

Nancy Kinner, Coastal Response Research Center, University of New Hampshire

Charlie Henry, NOAA's Gulf of Mexico Disaster Response Center

845 Background & Workshop Goals

900 Participant Introductions

930 Setting the Stage on SCAT

John Tarpley, NOAA Office of Response & Restoration, Emergency Response Division

950 SCAT Data to Response Information

Carl Childs, NOAA Office of Response & Restoration, Emergency Response Division

1010 Data Sharing Agreements and Mandates

Michele Jacobi, NOAA Office of Response & Restoration

1025 Data Infrastructure/Data Flow

Benjamin Shorr, NOAA Office of Response & Restoration, Assessment and Restoration Division

1040 *Break*

1055 IT Security Issues

David Wesley, NOAA Office of Response & Restoration, Emergency Response Division

1110 Panel Perspectives

1130 Q&A

1200 *Lunch*

100 NOAA Data Standard

Zach Nixon, Research Planning, Inc.

115 Panel and Discussion on SCAT Data Tools

245 *Break*

300 Breakout Group Session I: Current SCAT Capabilities/Needs

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding:

- Current concerns with respect to electronic data management for SCAT during oil spills?
- Future needs for SCAT to improve readiness and efficacy?

400 Group reports

430 Adjourn

DAY 2 – Thursday, January 19

830 Recharge & Recalibrate

845 Breakout Group Session II: Discussion of the Data Standard

1030 *Break*

1045 Group Reports from Breakout Session II

1145 *Lunch*

115 Plenary Discussion: Modifications to the proposed NOAA SCAT Data Standard

230 *Break*

245 Panel Discussion: Path Forward for proposed NOAA SCAT Data Standard

345 Closing Comments Including Points of Agreement

430 Adjourn

Appendix D: Plenary and Panel Presentation Slides

WELCOME

NOAA's GOM Disaster Response Center

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Charlie Henry, Director
NOAA Gulf of Mexico Disaster Response Center

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Nancy Kinner, UNH Co-Director
Coastal Response Research Center (CRRC)

SCAT for Tomorrow Workshop, January 18 & 19, 2017

LOGISTICS

- **Katie Krushinski DRC**

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WORKSHOP LOGISTICS

- **Cell phones / laptops**
- **Breaks (coffee, tea, snacks)**
- **Meals**
  - **$10/today's boxed sandwich lunch**
  - **Tomorrow lunch and dinners on your own**
  - **See restaurant map in packet**
- **Logistical questions – see Kathy Mandsager or me**

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Coastal Response Research Center (CRRC)

- **Partnership between NOAA's Office of Response and Restoration and the University of New Hampshire**
  - **Emergency Response Division (ERD)**
  - **Assessment and Restoration Division (ARD)**
- **Since 2004**
  - **UNH co-director – Nancy Kinner**
  - **NOAA co-director – Mark Miller**

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Overall CRRC Mission

- **Conduct and oversee basic and applied research and outreach on spill & environmental hazard response and restoration**
- **Transform research results into practice**
- **Serve as hub for spill /environmental hazards R&D**
- **Facilitate workshops bringing together ALL STAKEHOLDERS to discuss spill/hazards issues and concerns**

SCAT for Tomorrow Workshop, January 18 & 19, 2017

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WORKSHOP OBJECTIVES

- Assessment of current concerns regarding electronic data management for SCAT in oil spills;
- Evaluation of future needs for SCAT to improve readiness and efficiency;
- Definition of key data standards and data exchange formats to allow better management and sharing of SCAT data for response and Natural Resource Damage Assessment (NRDA); and
- Feedback from stakeholders on NOAA's draft data standard and data sharing agreement strategies regarding SCAT

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PARTICIPANT INTRODUCTIONS

- **Name**
- **Affiliation**
- **What is your interest for this workshop?**

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WORKSHOP QUESTIONS

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AGENDA – DAY 1, JANUARY 18

930 Setting the Stage on SCAT

John Tarpley, NOAA Office of Response & Restoration, Emergency Response Division

950 SCAT Data to Response Information

Carl Childs, NOAA Office of Response & Restoration, Emergency Response Division

1010 Data Sharing Agreements and Mandates

Michele Jacobi, NOAA Office of Response & Restoration

1025 Data Infrastructure/Data Flow

Benjamin Shorr, NOAA Office of Response & Restoration, Assessment and Restoration Division

1040 *Break*

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AGENDA – WEDNESDAY AFTERNOON

1055 IT Security Issues

David Wesley, NOAA Office of Response & Restoration, Emergency Response Division

1110 Panel Perspectives

1130 Q&A

1200 *Lunch*

100 NOAA Data Standard

Zach Nixon, Research Planning, Inc.

115 Panel and Discussion on SCAT Data Tools

245 *Break*

300 Breakout Group Session I: Current SCAT Capabilities/Needs

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding:

- Current concerns with respect to electronic data management for SCAT during oil spills?
- Future needs for SCAT to improve readiness and efficacy?

400 Group reports

430 Adjourn

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AGENDA – THURSDAY , JANUARY 19

830	Recharge & Recalibrate
845	Breakout Group Session II: Discussion of the Data Standard
1030	*Break*
1045	Group Reports from Breakout Session II
1145	*Lunch*
115	Plenary Discussion: Modifications to the proposed NOAA SCAT Data Standard
230	*Break*
245	Panel Discussion: Path Forward for proposed NOAA SCAT Data Standard
345	Closing Comments Including Points of Agreement
430	Adjourn

FACILITATION PLEDGE

- **I will recognize and encourage everyone to speak**
- **I will discourage side conversations**
- **I commit to:**
  - **Being engaged in meeting**
  - **Keeping us on task and time**
- **Stop me if I am not doing this!**

PARTICIPANT PLEDGE

- **Be Engaged**
  - **Turn off cell phones & laptops(except at breaks)**
- **Listen to Others**
- **Contribute**
- **Speak Clearly; Use Microphones**
- **Learn from Others**
- **Avoid Side Conversations**

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PANEL PERSPECTIVES

- State: Steve Buschang, Texas General Land Office
- Industry: Jeff Arnett, Shell
- USCG: CMDR JoAnne Hanson, Gulf Strike Team
- NOAA: Zach Nixon, Research Planning, Inc

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PANEL: SCAT DATA TOOLS

- SCATMAN, Kenneth Kumenius
- CORAL, Guillaume Nepveu
- POLARIS, Stephen Gmur
- TRG, Kenny Rhame
- CA OSPR, Isaac Oshima
- CTEH, Brady Davis

Panel and Discussion on SCAT Data Tools

- Describe the key features of your SCAT product?
- What are the innovative/novel approaches associated with your SCAT product?
  - New data being collected
  - New SCAT Information Product Ideas
- How does the data flow in your SCAT product?
- What features of your SCAT product align with the proposed NOAA SCAT Data Standard?

BREAKOUT GROUP I

- Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **current concerns with respect to electronic data management for SCAT during oil spills**?
- Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **future needs for SCAT to improve readiness and efficacy**?

Setting the Stage on SCAT

SCAT for Tomorrow Workshop
January 18-19, 2017

John Tarpley – NOAA
Ed Owens – Owens Coastal Consultants

What SCAT is....

- An internationally-accepted procedure for the surveying, documentation and description of oiled shorelines based on standard terms and definitions.
- Suitable for shorelines in marine or freshwater; coasts, rivers, & lakes; tropics to the arctic; any habitat or geomorphology.
- A cornerstone of support for Operations through the decision and planning process from the initial shoreline oiling until the last segment is signed off.
- In the United States, the SCAT process has become an integral part of the NIMS Incident Command System (ICS); and world-wide has become more formalized as part of many oil-spill response or contingency plans.

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SCAT Evolution… How?

- *The beginning*…..Dec. 1989 – T/B Nestucca spill:
  - Washington, US to Vancouver Island, BC
  - first survey w/ forms & interagency concept
  - Combined aerial Shoreline Evaluation Team (SET) in conjunction w/ ground Shoreline Surveillance Teams (SST).
- Mar. 1989 – Exxon Valdez:
  - 1989 – Exxon & ADEC separate surveys
  - 1990 – 1st Exxon/govt teams
  - Core team composed of geologist, biologist, archeologist
  - Aerial video/audio and mapping (VHS/Beta)
  - Shoreline segmentation was critical
  - 35mm film... NO digital
  - Sat phones, VHF, or fax…NO cellular
  - NO Internet, NO laptops, NO GPS

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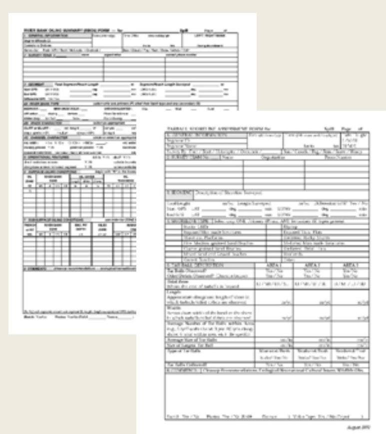
SCAT Evolution… continues

- Manuals created: BC in 1990, NOAA in 1992, EnvCan in 1994

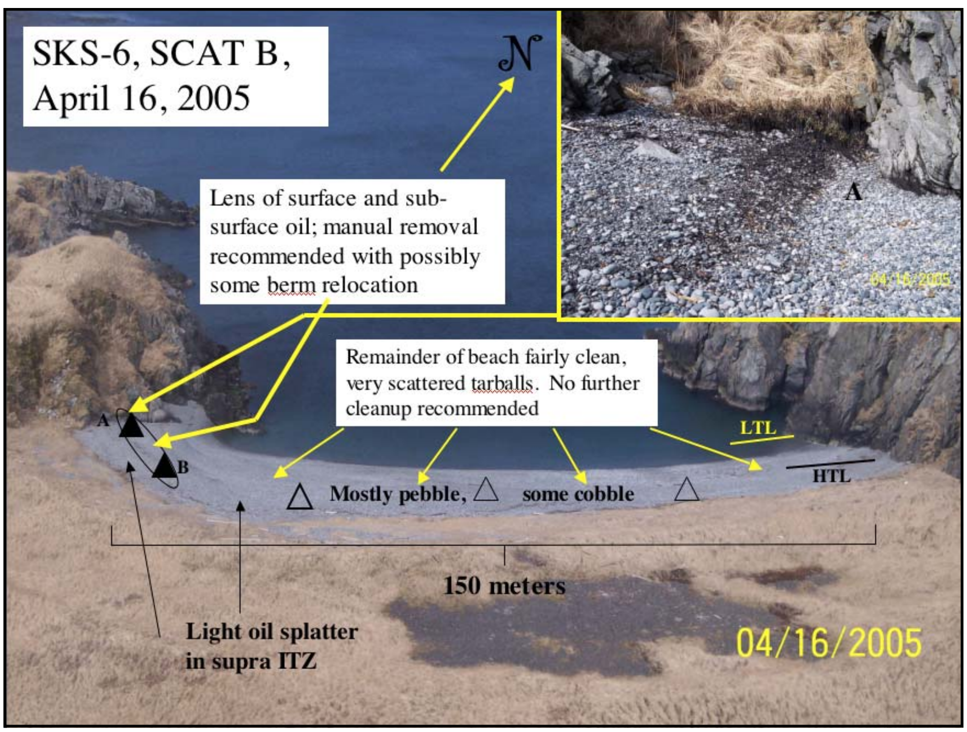


- 1996 – first "River SCAT forms"
- 1999 – first "Tar Ball SCAT forms" for the New Carissa incident
- Late 90's – 1st purpose-built SCAT database, "*ShoreClean*"

SCAT Evolution… continues

- ca. 2000 – EnvCan & NOAA produced 3rd-gen "modern" SCAT forms in use today
- 2004 – EnvCan Arctic SCAT manual

- 2004-2007 M/V Selendang Ayu (AK)
  - The concept of a formal procedure for SCAT field teams to create shoreline treatment recommendations ("**STRs**") and to have an inspection and sign-off process documented by shoreline inspection reports ("**SIRs**") was introduced
  - GIS becoming integral to SCAT mapping



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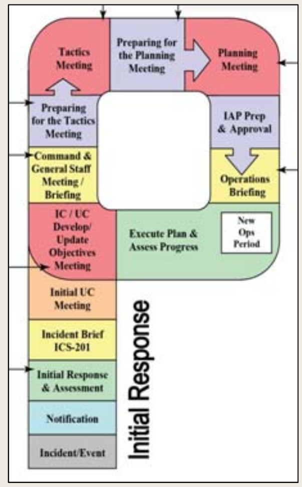
SCAT Evolution… continues

- 2007 to present:
  - SCAT becomes more integrated into ICS through the Environmental Unit (EU) and essential for operational sign-off
  - STR's and SIR's becoming "legal" documents
  - Direct Trustee involvement in SCAT increases (ESA, NHPA)
  - SCAT products & frequency from data increases



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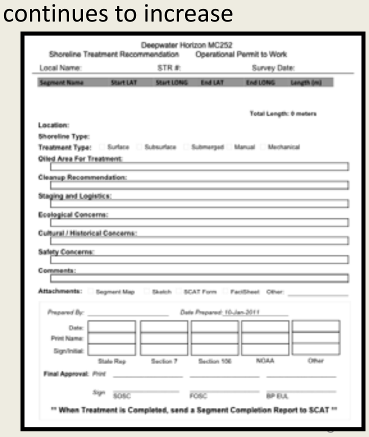
SCAT Evolution… continues

- 2010 to 2015: DeepWater Horizon / Macondo
  - Common Operational Picture (COP) via internet becomes a reality
  - Demand for SCAT products & frequency continues to increase
  - SCAT Database continues to evolve
  - SCAT fully integrated into ICS –

  STR and SIR critical for Ops progress
  - SCAT-Ops Liaison employed
  - SCAT GIS tested to new limits with

  non-linear shorelines and segmentation



Deepwater Horizon MC252
Shoreline Treatment Recommendation   Operational Permit to Work

Local Name: STR #:   Survey Date:

Segment Name	Start LAT	Start LONG	End LAT	End LONG	Length (m)

Total Length: 0 meters

Location:
Shoreline Type:
Treatment Type: Surface Subsurface Submerged Manual Mechanical
Oiled Area For Treatment:
Cleanup Recommendation:
Staging and Logistics:
Ecological Concerns:
Cultural / Historical Concerns:
Safety Concerns:
Comments:
Attachments: Segment Map Sketch SCAT Form FactSheet Other

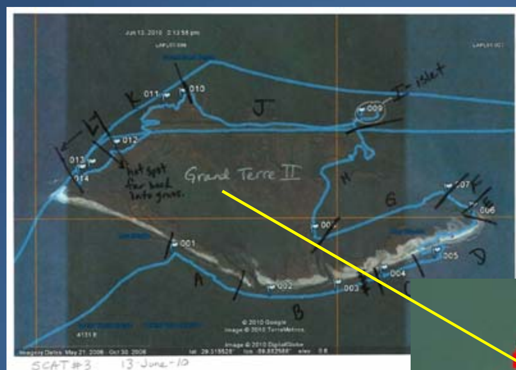
Prepared By: Date Prepared: 10-Jan-2011

Date:
Print Name:
Sign/Initial:
State Rep   Section 7   Section 106   NOAA   Other

Final Approval: Print
Sign   SOSC   FOSC   BP EUL

** When Treatment is Completed, send a Segment Completion Report to SCAT **

SCAT Field Maps and GIS



SCAT Annotated
Field Sketch Map

GIS Shoreline Current
Oiling Layers

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SCAT Evolution… How & Why?

- The concept has been proven
- The methods and terminology are unchanged
- It remains flexible and scalable

- Innovation is always present
- Advancing Technology
- The public
- The politicians
- The media
- Collaboration

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SCAT Evolution… the future?

SCAT for Tomorrow

TODAY

- The key to successful SCAT in the future is electronic data management and interoperability.
- The response community will continue to innovate.
- In the U.S., SCAT will always involve multiple players.

In order to conduct SCAT efficiently, effectively and produce products on demand, the methods and tools we use must be interoperable.

Working together for Success

Collaboration

Different Perspectives

Teamwork

Planning

Uncertainty

Adaptive Management

Open Communication

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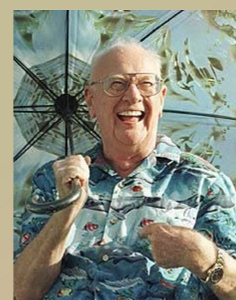
Outline

- SCAT data workflow
- **<u>DATA</u>**: The SOS form
- **<u>INFORMATION</u>**: Core SCAT products
  - Extent of Oiling
  - Shoreline Treatment Recommendations (STR's)
  - Inspection status
- Where do we need to go?

2

"Before you become too entranced with gorgeous gadgets and mesmerizing video displays, let me remind you that information is not knowledge, knowledge is not wisdom, and wisdom is not foresight. Each grows out of the other, and we need them all."

Arthur C. Clarke



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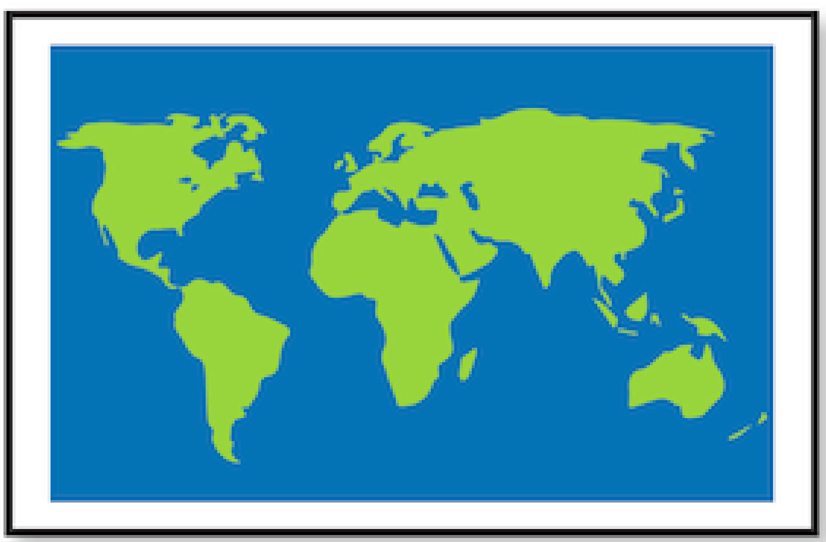
INFORMATION



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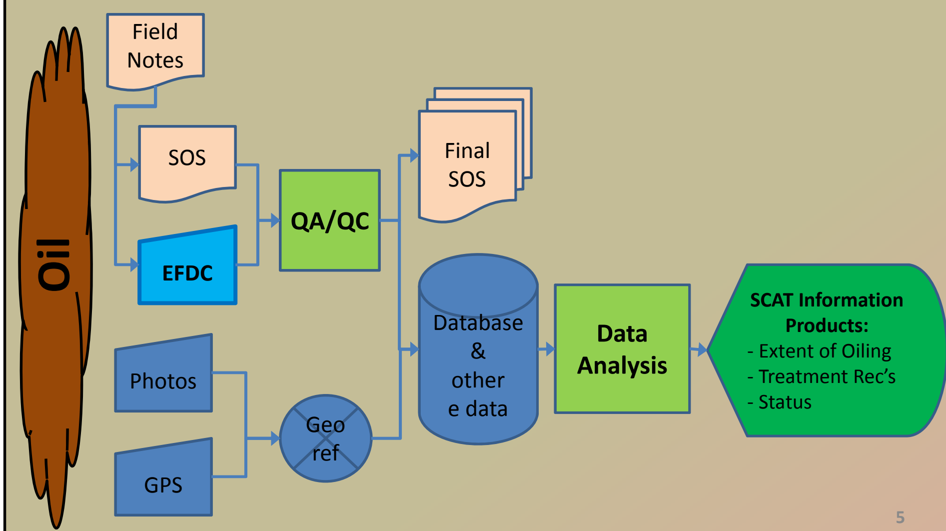
SCAT Information Generation



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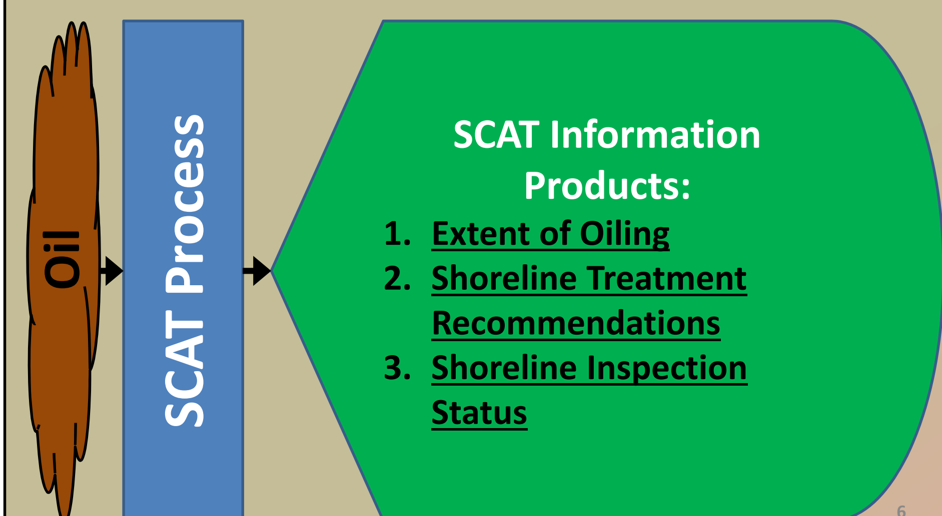
SCAT is About Information *not Data*



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The Data: SOS Form

SHORELINE OIL SUMMARY (SOS) FORM: ______________________ Spill   Page___ of _____

1. GENERAL INFORMATION	Date (dd/Month/yyyy) (please use month name)	Time (24h standard/daylight) (00:00 to 00:00)	Tide Height
Segment ID:			L / M / H
Segment Name:		___:___ to ___:___	Rising / Falling
Survey By: Foot /ATV/ Boat / Helicopter / Overlook / Other ______		Weather: Sun / Clouds / Fog / Rain / Snow / Windy / Calm	

2. SURVEY TEAM	Name	Organization	Name	Organization
Team Number				

3. SEGMENT	Total Length: m	Length Surveyed: m	Datum: WGS84
Survey Start GPS: WP:	LAT: .	LONG: .	
Survey End GPS: WP:	LAT: .	LONG: .	

Generic data about the survey.
Informs over all qualitative assessment of the survey.
(Other than the date) does not feed any core SCAT info products.

7

The Data: SOS Form

4a. BACKSHORE CHARACTER: Indicate only ONE Primary type and ALL Secondary types			
Cliff/Slope___ Lowland ___ Beach___ Dune___ Wetland___ Lagoon___ Delta___ Channel___ Man-Made___:________			
4b. ESI SHORELINE TYPE: Indicate only ONE Primary (P) and ANY Secondary (S) types. CIRCLE those oiled.			
Primary:	Secondary:		
5. OPERATIONAL FEATURES	Oiled Debris? Yes / No	Type:	Amount: (bags)
Direct backshore access? Yes / No	Alongshore access from next segment? Yes / No	Suitable for backshore staging? Yes / No	
Access Description / Restrictions:			

Confirmatory information – "Is the ESI correct?"
Informs how cleanup recommendations are written and presented to Ops.

Data does not directly feed SCAT products.

8

The Data: SOS Form

6. OILING DESCRIPTION: Indicate overlapping zones in different tidal zones by numbering them (e.g. A1, A2)

Zone ID	ESI Type	WP Start	WP End	Tidal Zone				Oil Cover						Oil Thickness					Oil Character							
								Area		Distribution		Size														
				LI	MI	UI	SU	Length (m)	Width (m)	Distr % >1	# per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No

These are the only DATA needed to calculate Extent of Oiling

7. SUBSURFACE OILING CONDITIONS: Format: Zone ID dash Trench Number in that Zone, e.g., "A-1, B-1, B-2"

Pit #	WP	Substrate Type Surface / Subsurface	Tidal Zone				Pit Depth (cm)	Oiled Interval (cm-cm)	Subsurface Oil Character										Water Table (cm)	Sheen Color B,R,S,N	Clean Below Yes / No
			LI	MI	UI	SU			OP	PP	OR	OF	TR	TB	SR	AP	NO	%			

9

Determining Oiling Category

Step 1

		Width of Oiled Area			
		Wide >6 m	Medium >3 m to 6 m	Narrow >0.5 m to 3 m	Very Narrow <0.5 m
Oil Distribution	Continuous 91 – 100%	Heavy	Heavy	Moderate	Light
	Broken 51 – 90%	Heavy	Heavy	Moderate	Light
	Patchy 11 – 50%	Moderate	Moderate	Light	Very Light
	Sporadic 1 – 10%	Light	Light	Very Light	Very Light
	Trace < 1%	Very Light	Very Light	Very Light	Very Light

Step 2

		Initial Categorization of Surface Oil			
		Heavy	Moderate	Light	Very Light
Average Thickness	Pooled Oil > 1 cm	Heavy	Heavy	Moderate	Light
	Cover 0.1 – 1.0 cm	Heavy	Heavy	Moderate	Light
	Coat 0.01 – 0.1 cm	Moderate	Moderate	Light	Very Light
	Stain/Film < 0.01 cm	Light	Light	Very Light	Very Light

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The Data: SOS Form

8. COMMENTS: Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions
Sketch: Yes / No   Photos: Yes / No   Photo Numbers: (-   ) Photographer Name:

2014

Can be enough on small spills.
Lots of problems using this for large spills.

11

The Information: Extent of Oiling

	Shoreline Oiling Categories (miles and %) - Refugio Incident															
Most Recent Survey Date	Heavy		Moderate		Light		Very Light		Tar balls (<1%)		No Oil Obs.		Background		Total Oiled Shoreline	Total Surveyed Shoreline
5/28/2015	2.54	6.8%	12.76	34.1%	11.11	29.7%	1.48	4.0%	1.58	4.2%	2.72	7.3%	5.25	14.0%	29.48	37.45

Heraclitus of Ephesus

No man ever steps in the same river twice, for it is not the same river and it is not the same man.

~ 500 BC

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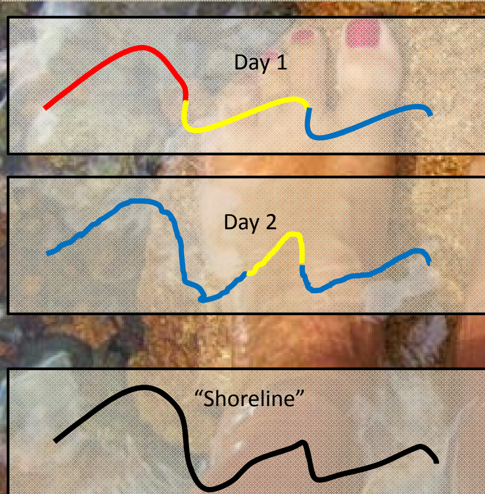
"Snapping"

Or,
How to avoid briefing the UC on ancient Greek philosophy.



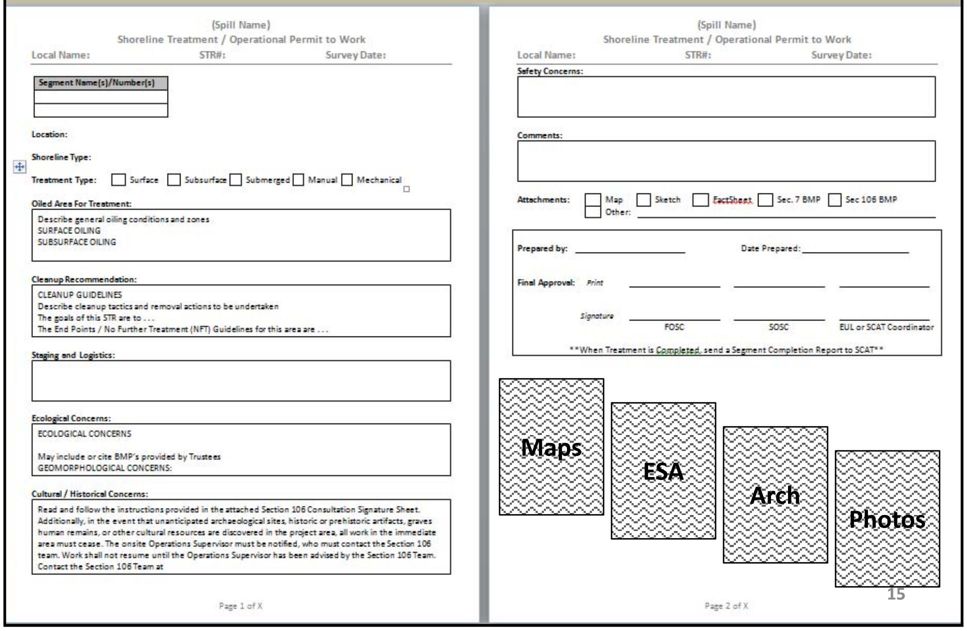
The length and location of these lines are different.

But they need to be the same.

Extent of oiling is NOT a sum of track lines.

It is calculated by "snapping" observed oiling zones to a canonical shoreline.

Shoreline Treatment Recommendations



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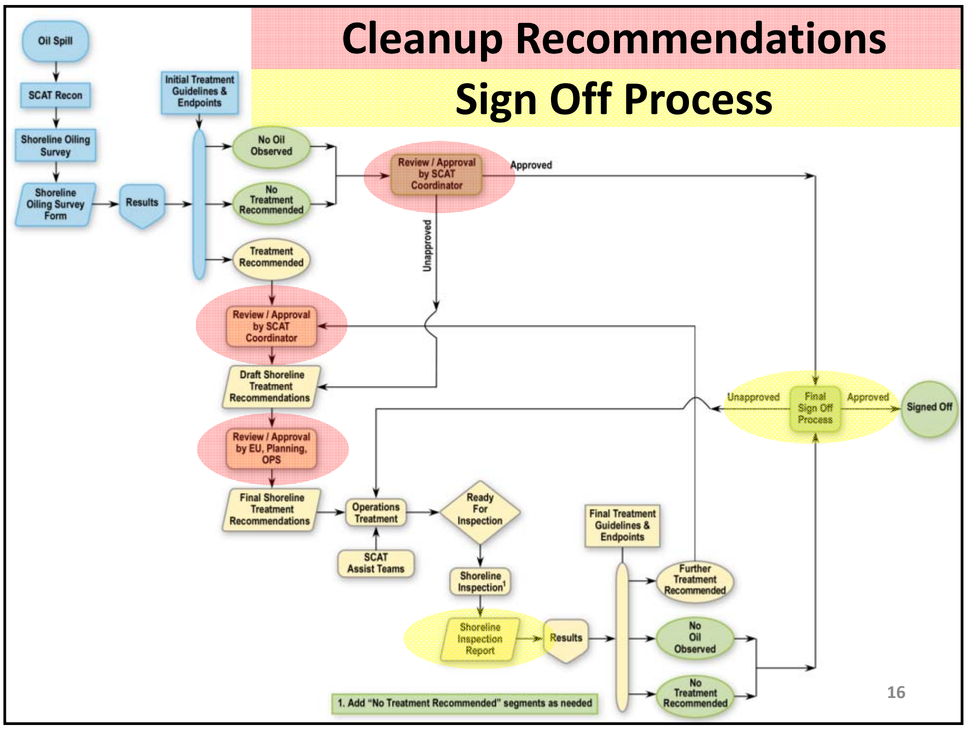
Cleanup Recommendations

Sign Off Process



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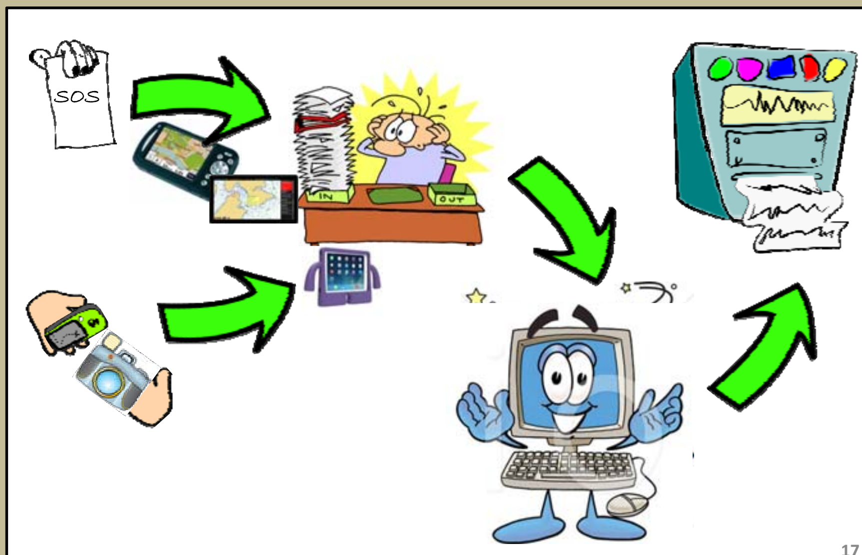
SCAT Data Management



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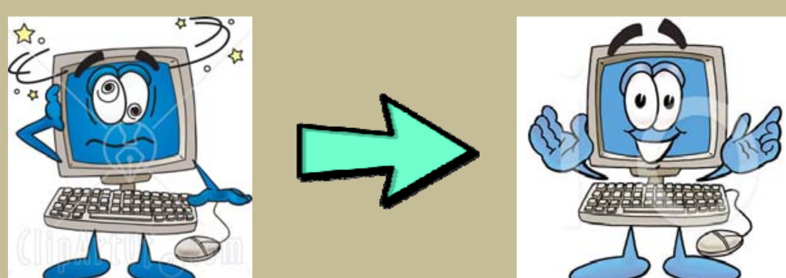
We Need a Common Data Standard



- Multiple data entry options
- Integration with other systems
  - (photos, documents, COP, Archives)
- Foster development
- **Interoperability!**

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THE END

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Office of Response and Restoration

Data Sharing Agreements and Federal Data Mandates

NOAA Office of Response & Restoration
January 18, 2017

NOAA | National Ocean Service | Office of Response and Restoration

Data is Key

- *"Situational Awareness and Common Operating Picture (SA/COP) support the Communications and Information Management component of the* ***National Incident Management System (NIMS)****"*
- *"Individuals and organizations at all levels of response have a responsibility to both contribute to and use reliable information as a part of incident response efforts."*

(FEMA E0948 SA/COP Training)

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Data Sharing Plan Concept

- Data is the foundation of any effective COP
- DSP documents all cooperatively collected and processed data
- Defines what, when and where data will be made available
- Cooperatively developed by RP, Feds, States & signed by Unified Command

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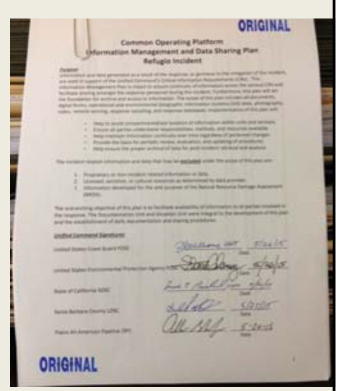
Data Sharing Plan

- Began as DWH Command briefing delivery target for data collectors
- Has been implemented in recent spills and practiced in many drills
- Cooperative development is key



What the Data Sharing Plan Ensures

- Cooperation between all data providers
- Data partners all have access to the same data
- Standard formats & approaches: Interoperability
- Continuity of information
- Data retention during and after the response

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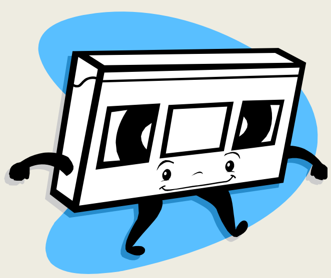
Data Sharing Plan in ICS

- Part of the ICS Documentation Plan
- Not about data ownership, ownership is not transferred, but data are shared
- Everyone gets copies of original, environmental, and operational data



"Need to DVR the data on a daily basis"

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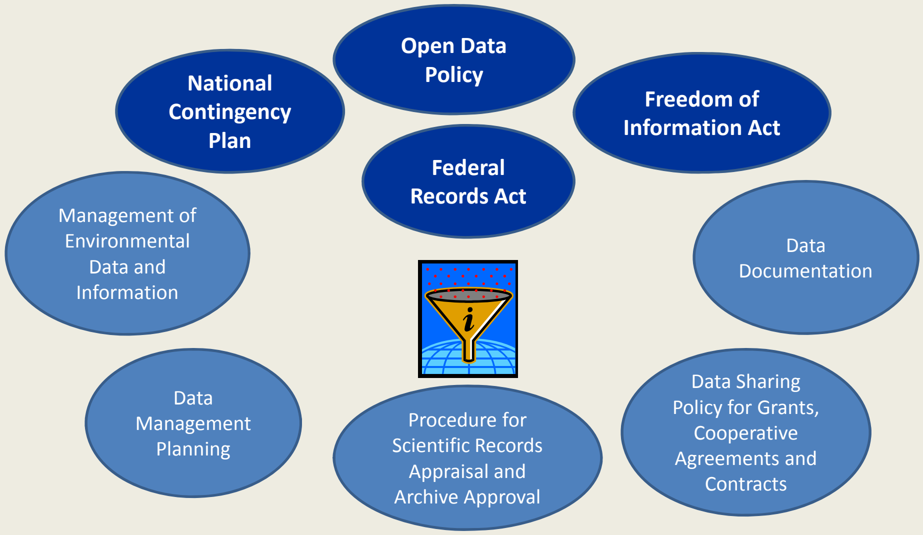
Federal Data Management Policies



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Federal Data Management Policies

- **National Contingency Plan** The National Oil and Hazardous Substances Pollution Contingency Plan, is the federal government's blueprint for responding to both oil spills and hazardous substance releases
- **Freedom of Information Act (FOIA)** Ensures the public the right to request access to records from any federal agency.
- **Federal Records Act-** The act and its related regulations define Federal records, mandate the creation and preservation of those records necessary to document Federal activities, establish Government ownership of records, and provide the exclusive legal procedures for the disposition of records

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Federal Data Management Policies

- **Open Data Policy – Managing Information as an Asset:** OMB Executive Order (M-13-13)
- Memorandum requires agencies to collect or create information in a way that supports downstream information processing and dissemination activities.
- Open Data Policy Memorandum: http://www.whitehouse.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf

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Federal Data Management Policies

- NOAA Administrative Order (NAO) 212-15, **Management of Environmental Data and Information**
- This policy provides high-level direction that guides procedures, decisions, and actions regarding environmental data and information management throughout NOAA.

Federal Data Management Policies

- **NOAA Data Documentation Procedural Directive** - This procedural directive states that NOAA's environmental data and information must be carefully documented using international metadata standards
- **NOAA Data Management Planning Procedural Directive** -Expands upon this requirement for Data Management Plans (DMPs), direct managers of all data production projects and systems

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Federal Data Management Policies

- **NOAA Data Sharing Policy for Grants, Cooperative Agreements and Contracts Procedural-** Designed to ensure that environmental data funded extramurally by NOAA are made publicly accessible in a timely fashion (typically within two years of collection), and that final manuscripts of peer-reviewed research papers are deposited with the Central Library.
- **NOAA Procedure for Scientific Records Appraisal and Archive Approval** This document defines the procedure by which NOAA decides what scientific records (environmental and geospatial data) are preserved in a NOAA archive.

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Questions?

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Common Operating Platform
Data Management and Sharing Plan
Sector NOLA PREP Drill 2015

Purpose:
Information and data generated as a result of the response, mitigation efforts, or other similar activities (the "Response") related to the Sector NOLA Prep Drill Oil Spill (the "Incident"), are used in support of the Unified Command's Critical Information Requirements (CIRs). This Data Management and Sharing Plan (the "Plan") is meant to ensure continuity of information across the various CIRs and facilitate sharing amongst the response personnel during the incident. Furthermore, this plan will set the foundation for access to information and archive of data.

Implementation of this plan will:

- Reduce compartmentalized isolation of information within ICS units and sections
- Ensure all parties understand responsibilities, methods, and resources available
- Maintain information continuity over time regardless of personnel changes
- Provide the basis for periodic review, evaluation, and updating of procedures
- Ensure the proper archival of data for post-incident retrieval and analysis

What is covered under this Plan:

This plan includes all incident related documents, Geographic Information Systems (GIS) data, photography, video, remote sensing, response sampling, response databases, and corresponding metadata as described in accompanying appendices.

The incident related information and data that may be **excluded** under the scope of this plan are:

1. Proprietary, confidential, privileged or non-incident related information or data.
2. Licensed, sensitive, or cultural resources as determined by data provider.
3. Information developed for the sole purpose of the Natural Resource Damage Assessment (NRDA).

The overarching objective of this plan is to facilitate availability of information to all parties involved in the response. The Documentation Unit and Situation Unit were integral to the development of this plan and the establishment of daily documentation and sharing procedures.

Unified Command Signatures:

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Common Operating Platform

COP Data Management and Sharing Plan: Sector NOLA 2015 THIS IS A DRILL

APPENDIX I: Data, Sharing and Archive Process

This appendix describes the different types of incident and related data being created and covered under the Plan to meet Critical Information Requirements (CIRs) of the Unified Command (UC). It provides specific details about file types, processing responsibilities, delivery schedule and use restrictions. It also describes who is managing the data, how and when the data will be shared and disseminated to other response staff, if there are any sharing or use restrictions, and how sharing would be managed for the public if appropriate.*

This outline describes the functional sections of this appendix. Each Section provides a description and table to capture the pertinent information being created and the operational cycle that each dataset will support for addressing UC CIRs.

Section I – DATA MANAGEMENT AND SHARING PROCESS
- GIS Data
- Photography & Video
- Remote Sensing
- Response Sampling
- Response Databases

Section II – DATA PRESERVATION AND PROTECTION
- Short-Term Storage
- Long-Term Storage
- Transfer to Long-Term Storage

Section III – COMMON OPERATING PICTURE
Section IV – DATA INFRASTRUCTURE AND HARDWARE
Section V – METADATA AND FILE NAMING
Section VI – REFERENCES

* For any data to be released to the public, it must be approved and released by Unified Command.

DRAFT

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Common Operating Platform

Dataset	Data Type & Format	Description	Temporal Coverage	Delivery Schedule	Use Restrictions	Method of Field Collection	Field Collector & P.O.C.	Data Processor & P.O.C	Short-Term Repository
Trajectories	Shapefiles	Fate and effect modeling of oil for operational planning	Daily	Daily	response	Models	NOAA	NOAA	Shell COP, ERMA, ResponseLink, sFTP
NOAA Overflights	Shapefiles	Overflight observations and trackline from the NOAA observer flights	Daily	Daily	response	Field Observations	NOAA	NOAA	Shell COP, ERMA, ResponseLink, sFTP
Shoreline Cleanup Assessment Techniques (SCAT)	Shapefiles	Shoreline Cleanup Assessment oiling observations	Daily	Daily	response	Field Observations	Planning Section	NOAA	Shell COP, SCAT database, sFTP
Culturally Sensitive Areas	Shapefile	Areas determined by LA SHPO to have archeological or cultural significance	Static	As Needed	response	N/A	LA SHPO	LA SHPO	Shell COP, sFTP,
Wildlife Observations	Shapefiles, spreadsheets	Wildlife observations as reported by Operations	Adhoc	Daily	response	Field Observations	Ops Section	Geomatics, Situation Unit	Shell COP, ERMA, sFTP
Vessel Locations	REST feed	Operational vessel locations based off of AIS feeds.	Continuous	Daily	response	AIS	Planning Section	Geomatics, Situation Unit	Shell COP
Area of Operations	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP
Overflight Observations	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP
GRP Status	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP
Boom Status	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP
Shell Base data	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP
Decon Locations	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP
Flotilla Locations	REST feed			Daily	response	REST feed	Planning	Geomatics	Shell COP

* For any data to be released to the public, it must be approved and released by Unified Command.

SCAT: Infrastructure and Data Flow Perspective

Ben Shorr

NOAA Office of Response and Restoration

SCAT For Tomorrow Workshop

Jan 2017

NOAA | Office of Response and Restoration

Overview

- Overarching IT Security (Dave)
- Requirements should drive Specifications
  - For both system and data
- Scalability and Flexibility
- Data Collection
- Data Warehouse (Data Model)
- Data Access

Scalability

- Approach must be able to scale from small to large response
- Process accommodates offline to online work flow
- Incorporate data from multiple sources
- Secure user login and privileged access
- Provide for data to information AND long-term data management/sharing (e.g. Archive)

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…and Flexibility

- Data Collection:
  - Paper notes
  - Digital data (e.g. transcribed notes to Excel/Access)
  - Electronic transmittal (e.g. handheld device)
  - Full package of information; related samples
  - Maintain litigation quality data
- Data Storage: ability to expand capacity

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Interoperability (Data In/Out)

- Based on SCAT Data Specification(s)
- Ingest full data packages from multiple sources
- Use or develop Electronic Data Deliverable (EDDs) templates
- Data Access: provide multiple ways to share full data packages
- Metadata driven – data providers create metadata; data management system generates metadata (ideal- mandated)

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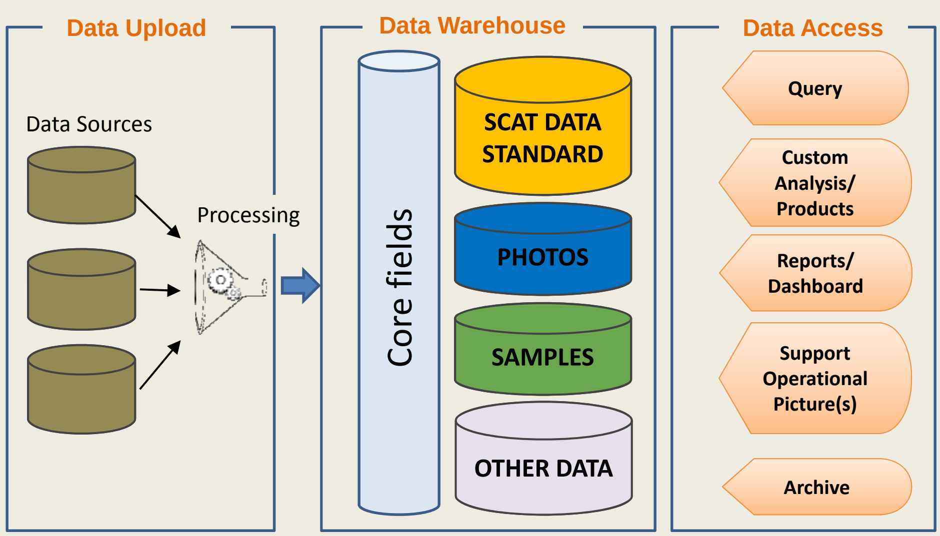
Potential NOAA Data Flow (simplified)



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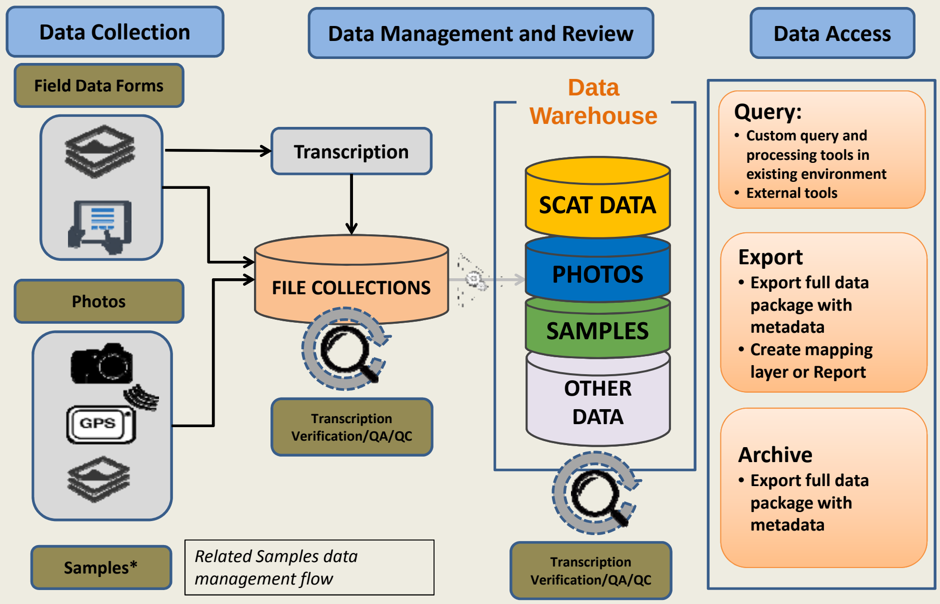
SCAT Data Flow (More Details)



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Data Flow Even MORE Details

- Just kidding.

IT Security Issues - SCAT data in a federal agency

January 18, 2017

David Wesley

NOAA

Times are a changing

The IT security landscape has been changing. Federal agencies are facing heightened pressure to rigorously protect data.

- Any data that passes through our hands
- From cradle to grave
- From theft, but also from intentional corruption

Federal agencies need to "certify" that data hasn't been tampered with (data lifecycle documented and approved by an Information System Security Officer).

Why does SCAT care?

NOAA's SCAT database
Now: on a single machine in the command post, 1 user
Future: on a server in the command post or on the web, many users

Government data can't pass through or reside on a non-gov server

- Can't use non-certified cloud services
- Data can't pass through data collection servers
- Where do you securely archive SCAT data once a response is done?

Some specifics

- Non-gov servers must be FedRAMP certified: involves Assessment and Authorization (A&A) process
- Applications built on approved technology stacks (unix-CentOS, PostgreSQL, open source JavaScript libraries) get approved easier
- Accessibility requirements (section 508 compliance)
- Password standards (30 day expiration, no group accounts)
- Annual security scans
- Extensive documentation to validate IT Security standards have been met

Bottom line

Building SCAT software that's usable by government agencies now take a lot more work than in the "old days".

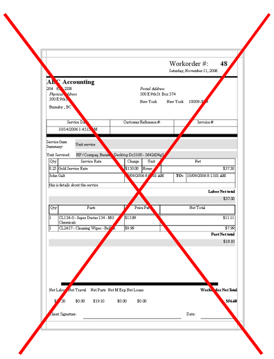
Headline

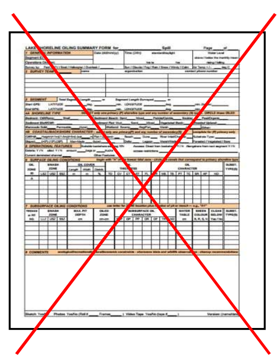
Text (flush left or centered)

SCATMAN

NOAA
January 2017

Do not waste your time on manual writing in the field





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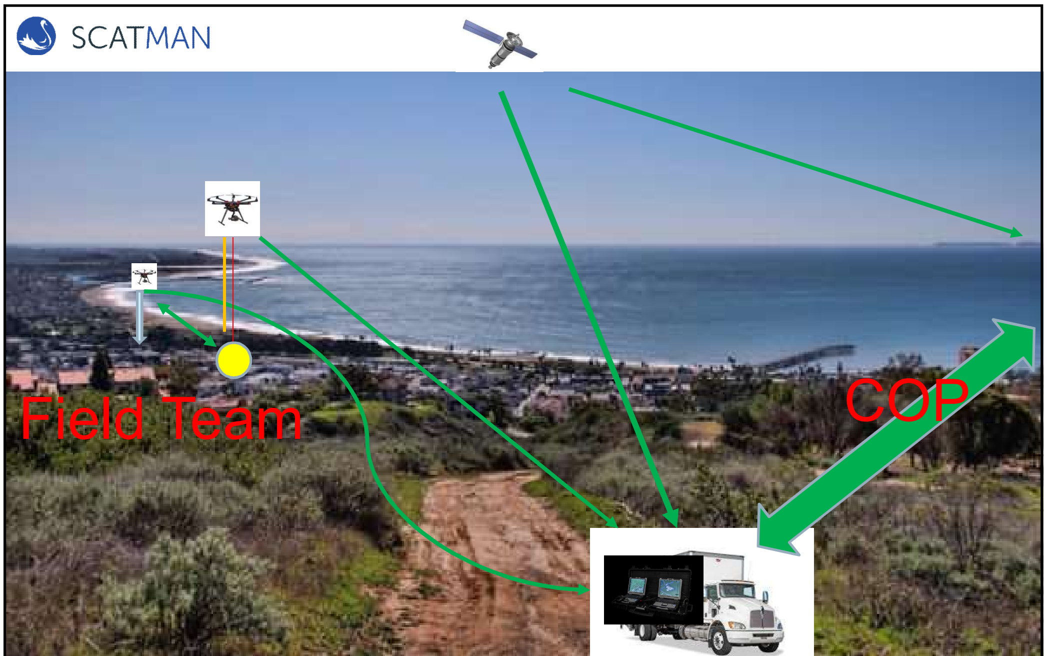

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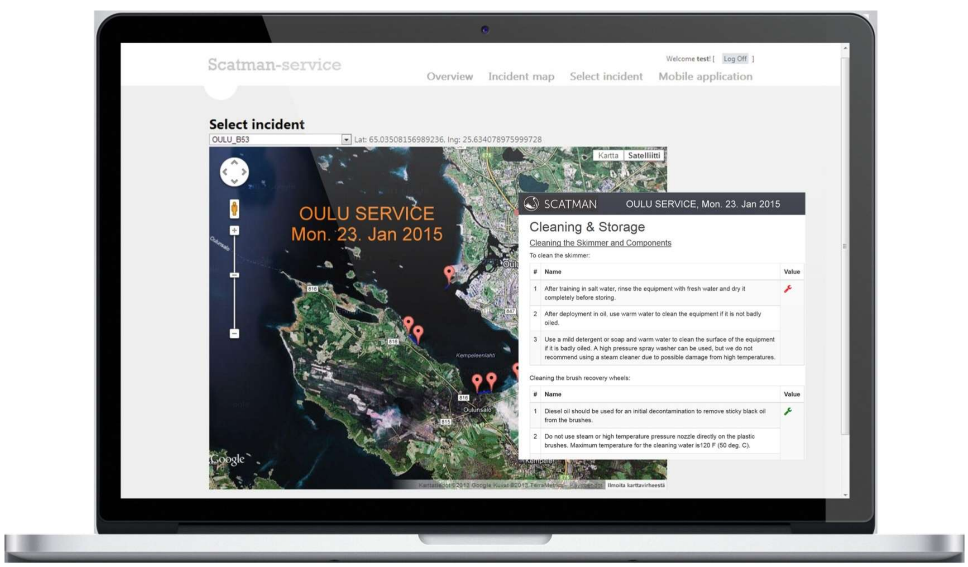

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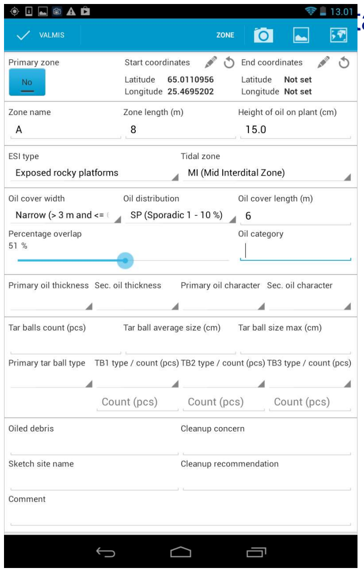

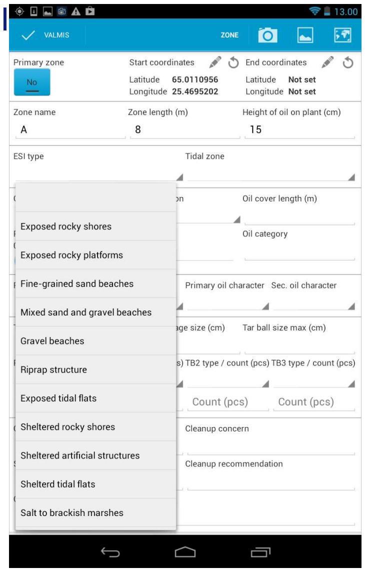

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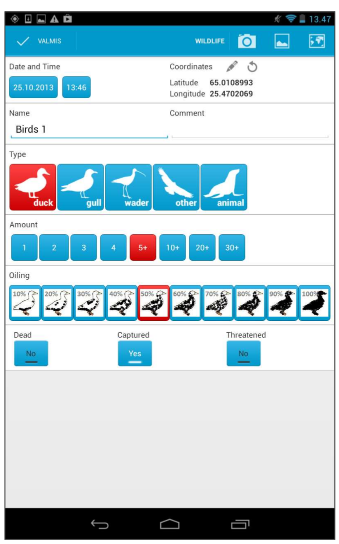
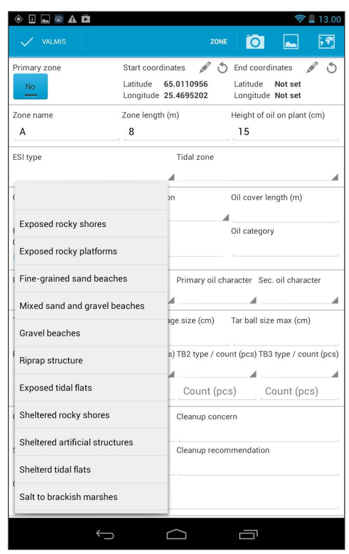
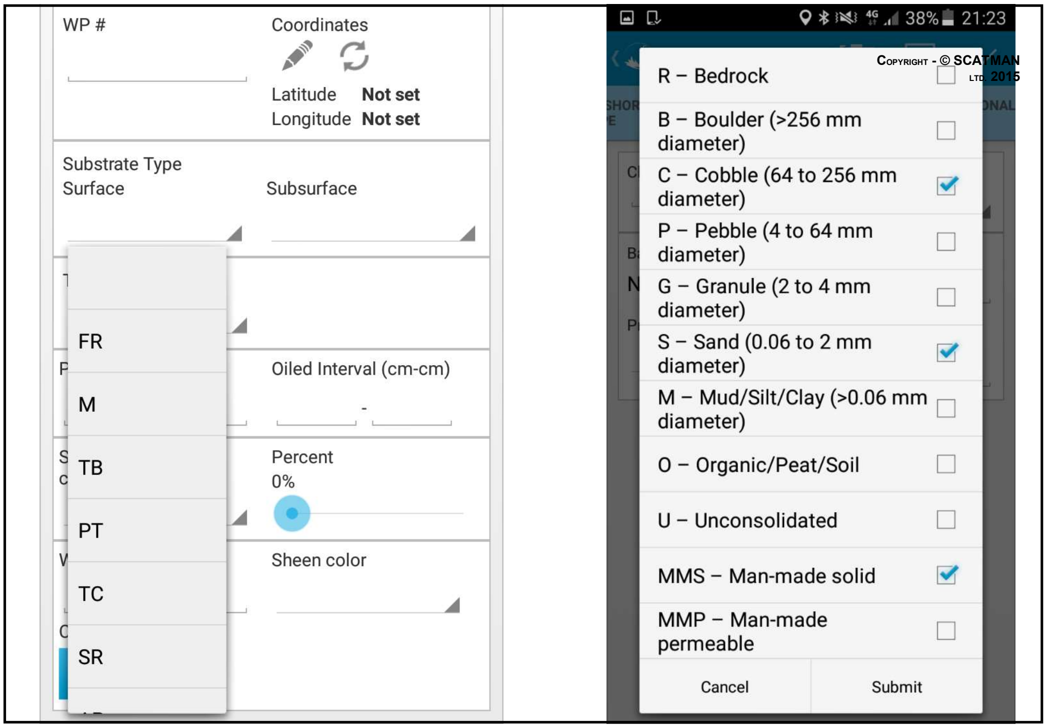
SCAT mobile application



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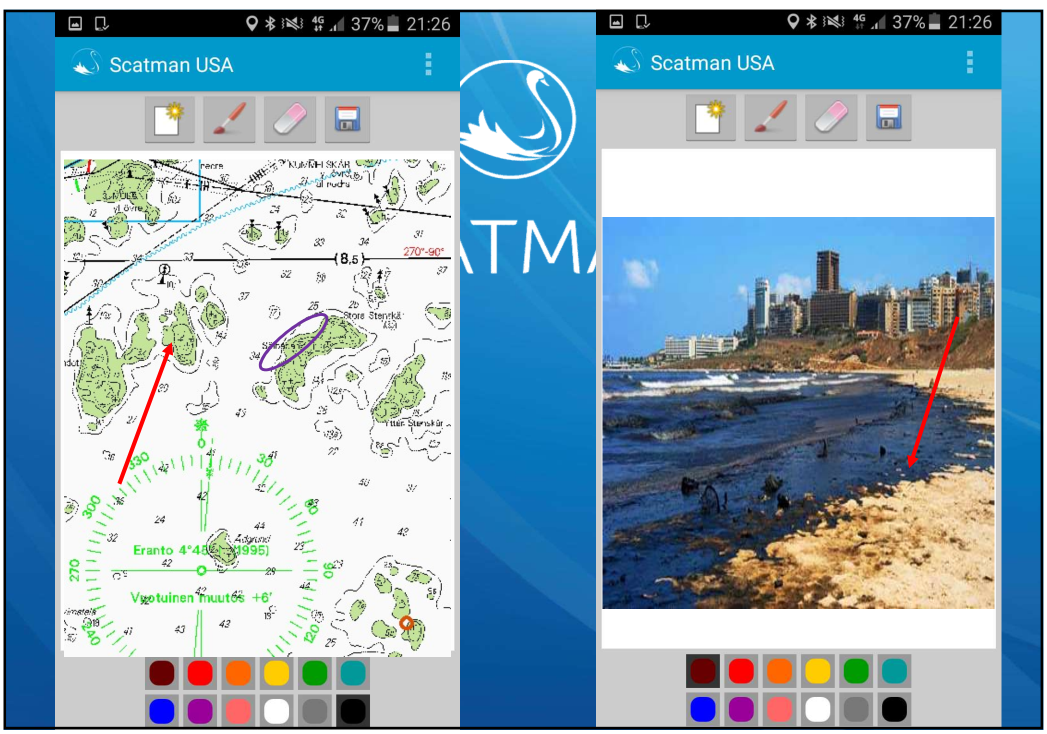
Coordinates
Latitude Not set
Longitude Not set
Substrate Type
Surface
Subsurface
FR
M
TB
PT
TC
SR
Oiled Interval (cm-cm)
Percent
0%
Sheen color
38% 21:23
Copyright - © SCATMAN LTD 2015
R – Bedrock
B – Boulder (>256 mm diameter)
C – Cobble (64 to 256 mm diameter)
P – Pebble (4 to 64 mm diameter)
G – Granule (2 to 4 mm diameter)
S – Sand (0.06 to 2 mm diameter)
M – Mud/Silt/Clay (>0.06 mm diameter)
O – Organic/Peat/Soil
U – Unconsolidated
MMS – Man-made solid
MMP – Man-made permeable
Cancel
Submit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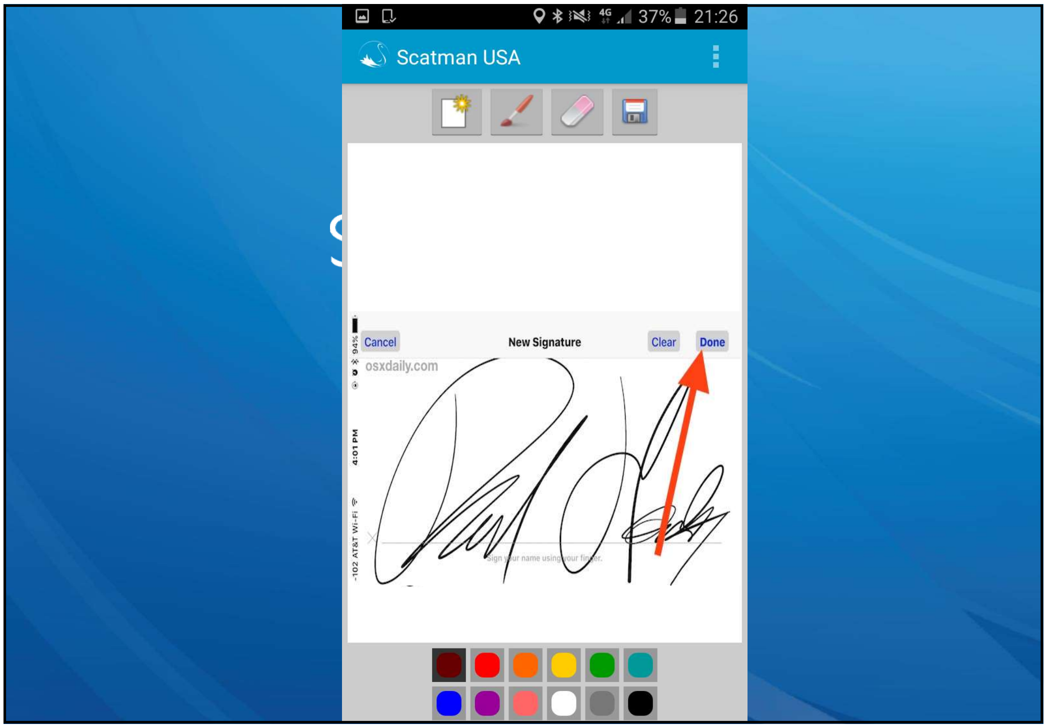
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Cancel
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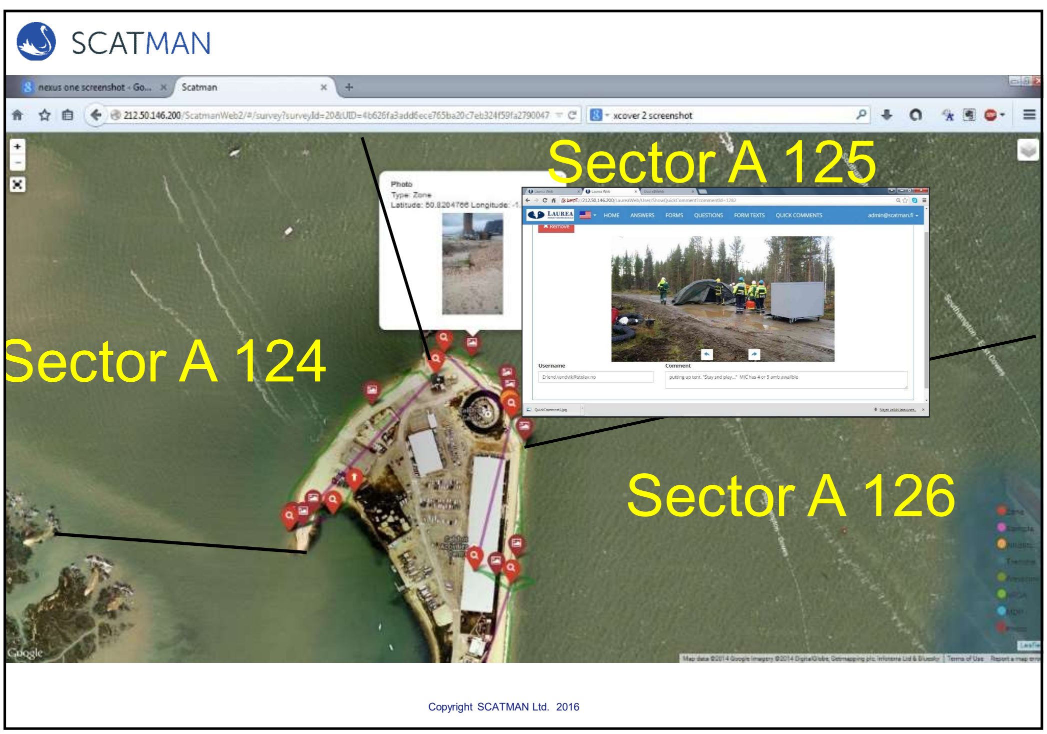
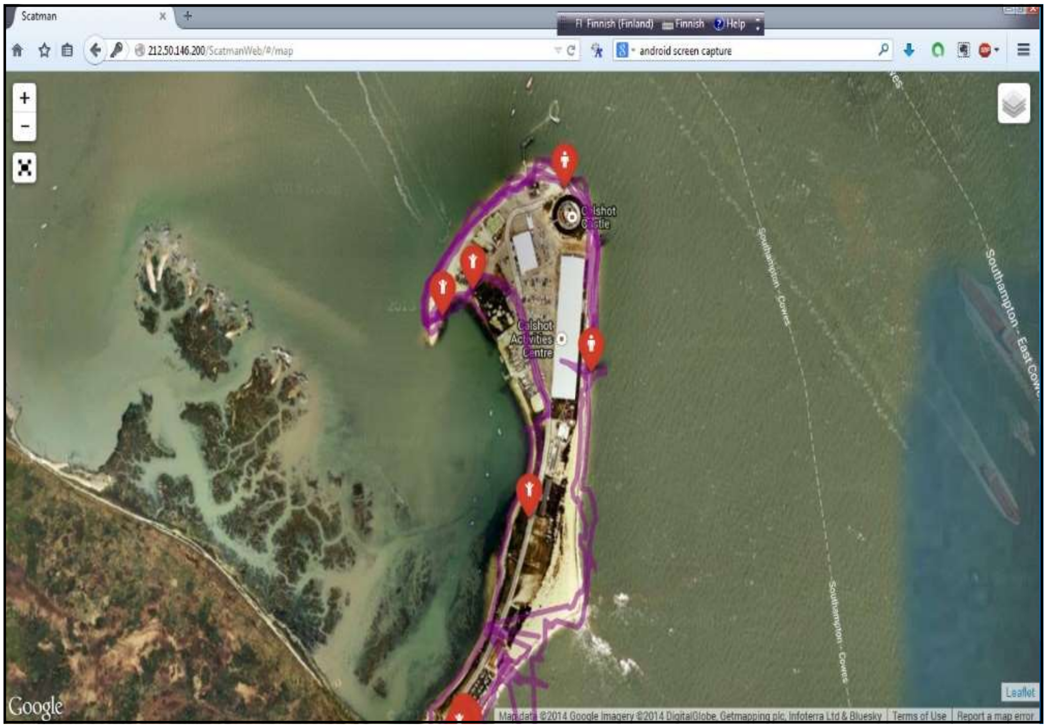

SCATMAN
Sector A 125
Sector A 124
Sector A 126
Copyright SCATMAN Ltd. 2016



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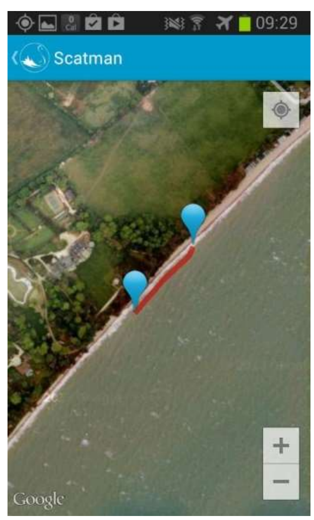
SCAT mobile application



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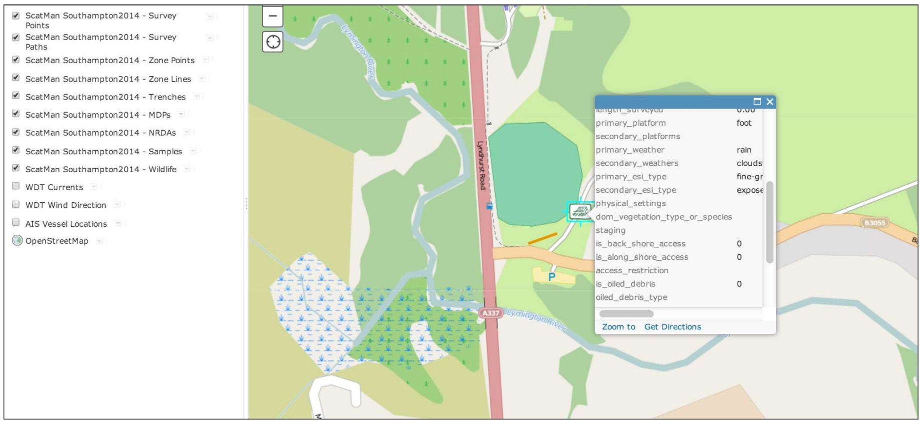
SCAT - Southampton Drill
Integration to COP (Common Operating Picture)



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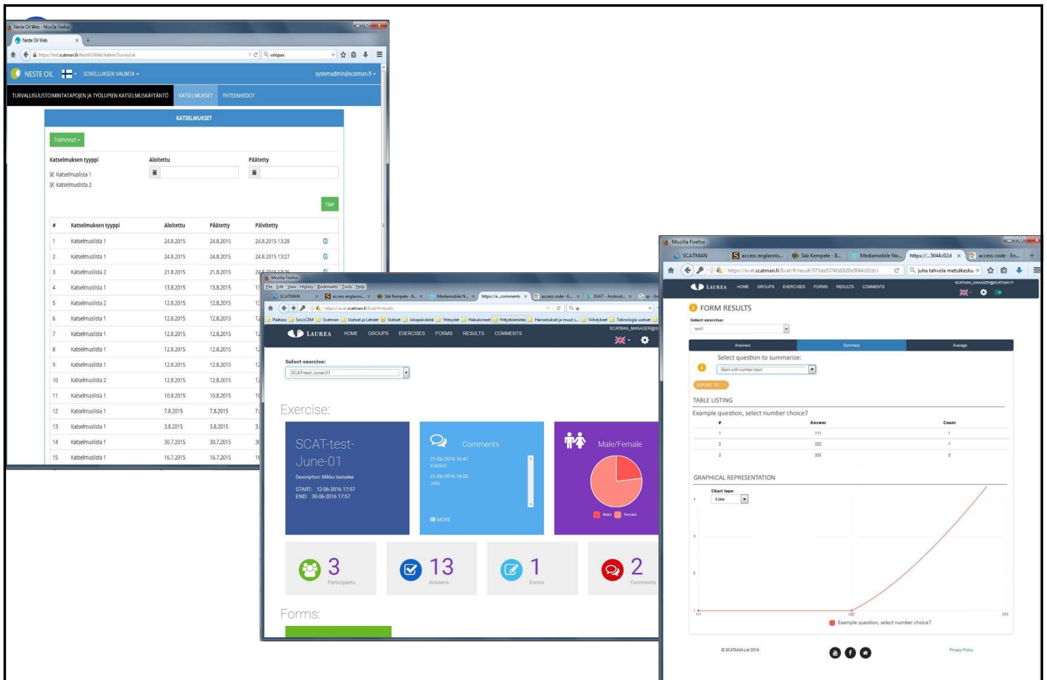

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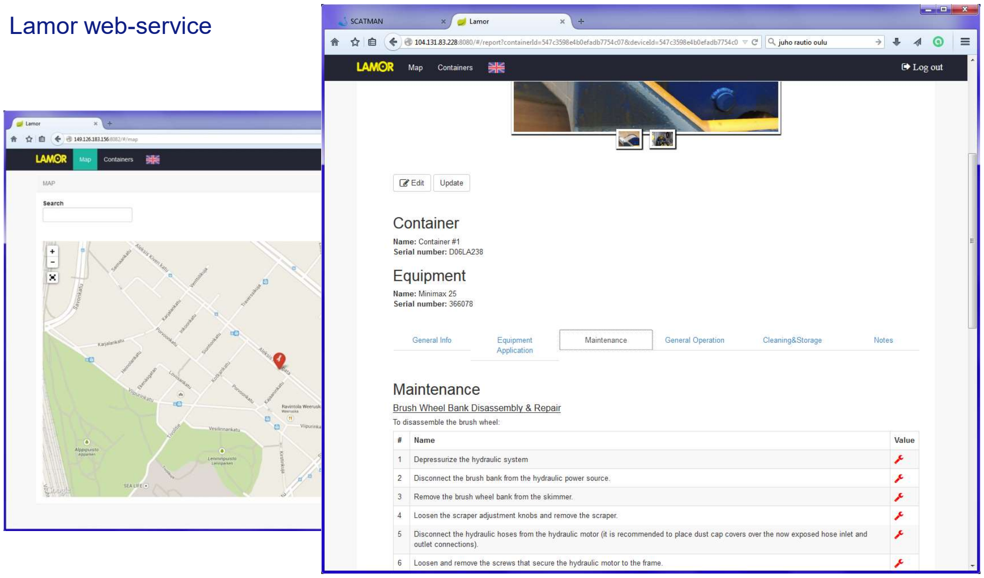
Lamor web-service



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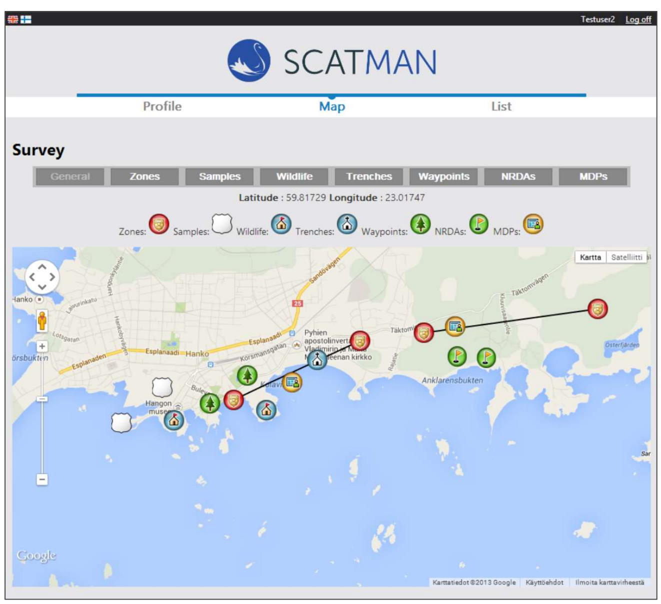
SCAT - Web service



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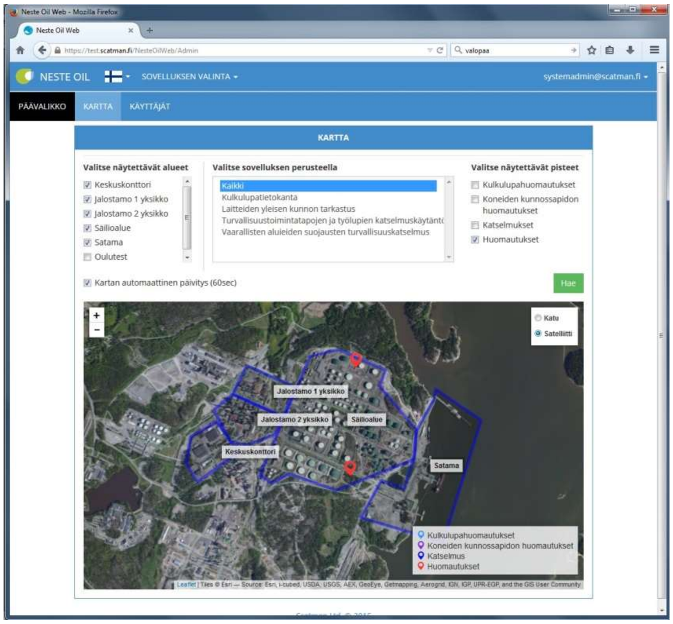
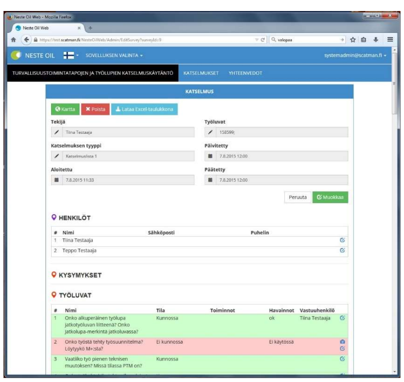
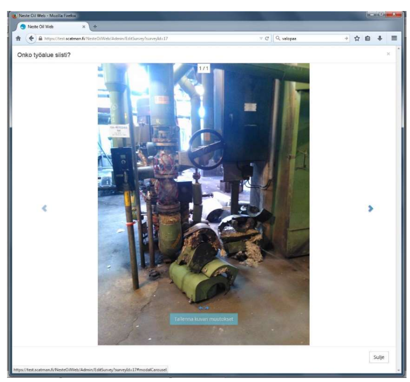
SCATMAN **Neste Web Service** **CONFIDENTIAL**







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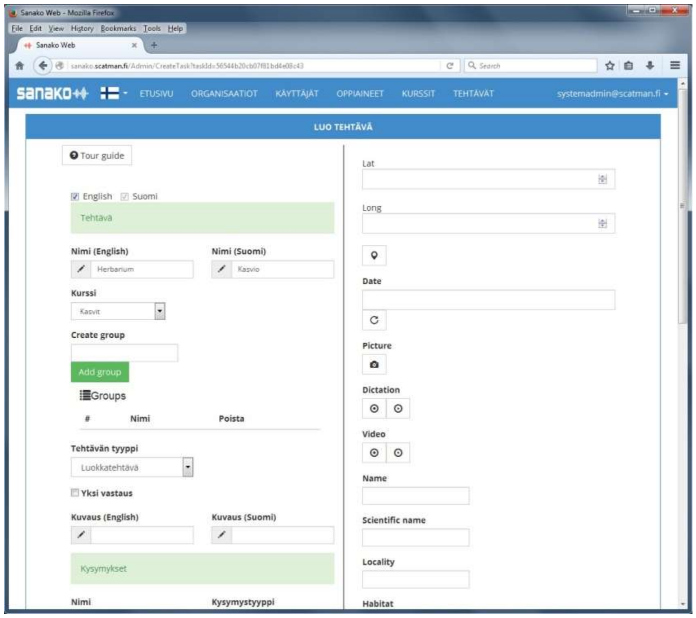
Sanako eLearning - Web Service



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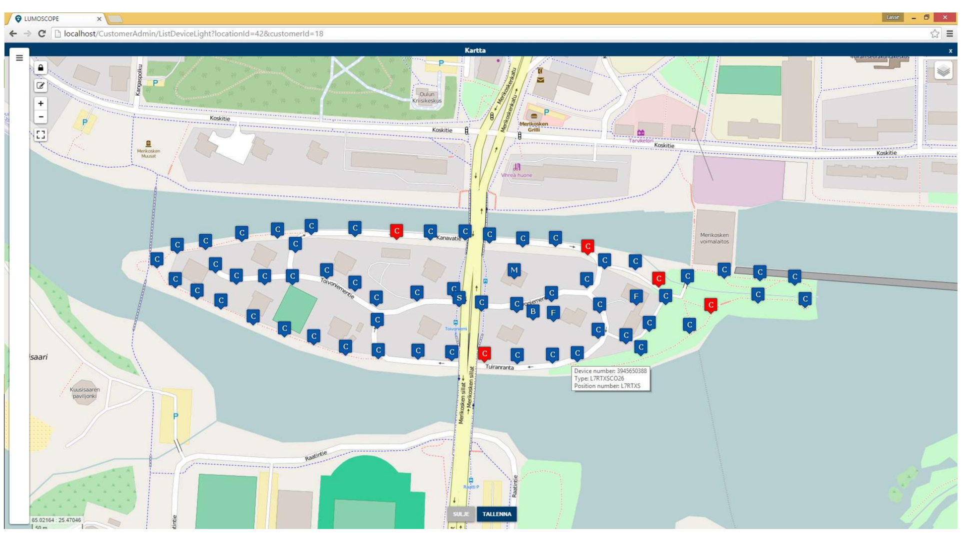
Valopaa - Web service



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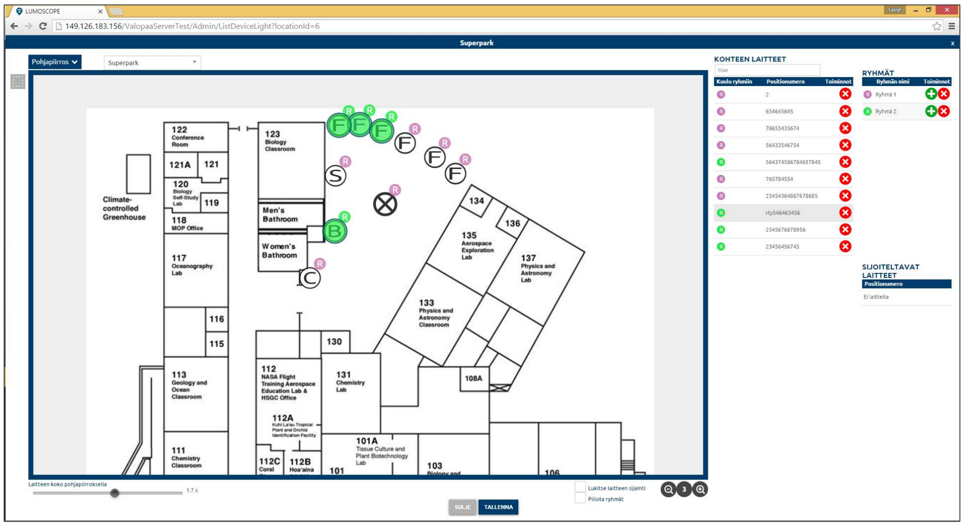
Valopaa - Web service



SCATMAN

THANK YOU

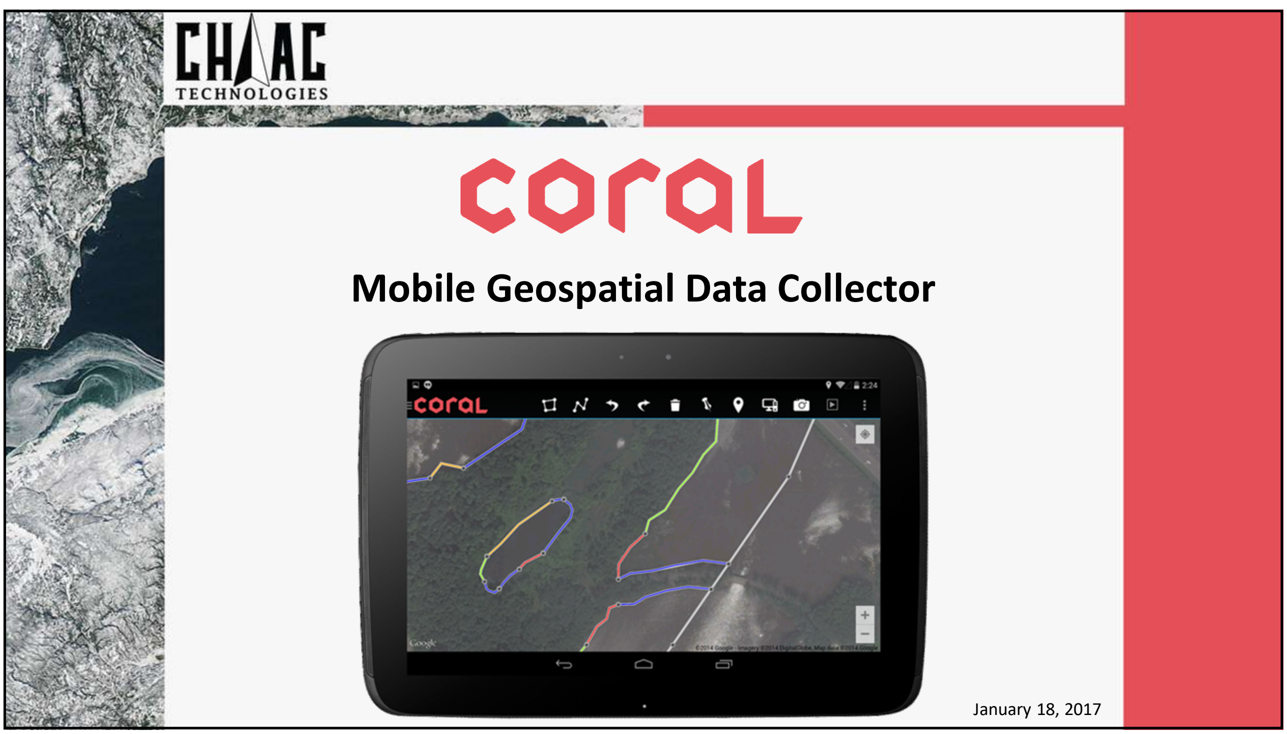
Kenneth Kumenius
Development & Project Manager
Co-Founder

www.scatman.fi

kenneth@scatman.fi

+358 40 57 99 996


TECHNOLOGIES
www.coralmobile.net


TECHNOLOGIES
coral
Mobile Geospatial Data Collector
January 18, 2017

CHAAC TECHNOLOGIES

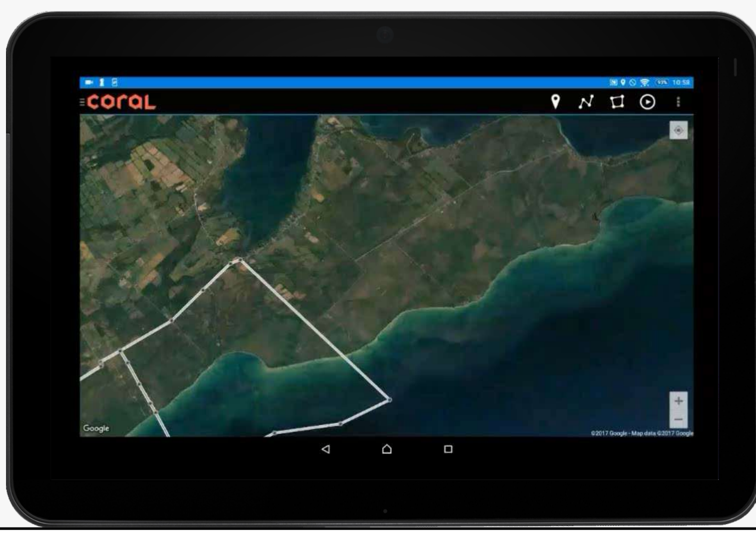
Content

- Key features
- Innovative approaches
- Data flow
- Features that align with NOAA standards
- Impacts of NOAA standards

CHAAC TECHNOLOGIES

Key Features

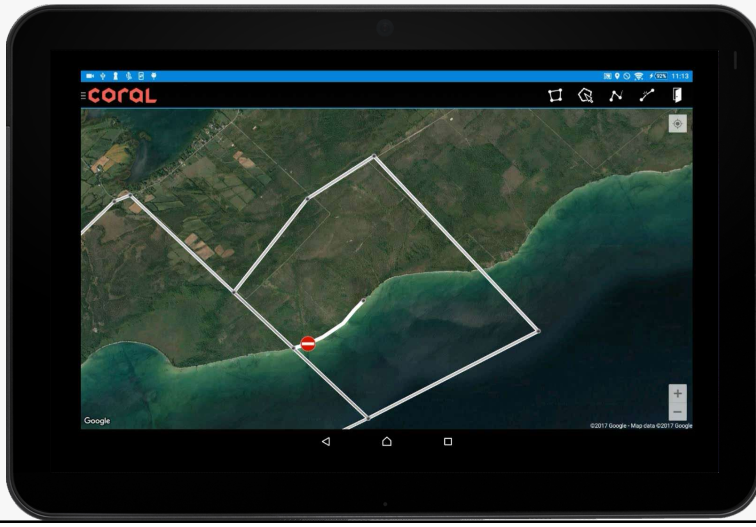
Supports all feature types including points, lines and polygons



CHIMAC TECHNOLOGIES

Key Features

Multiple GIS functions including geometry edition

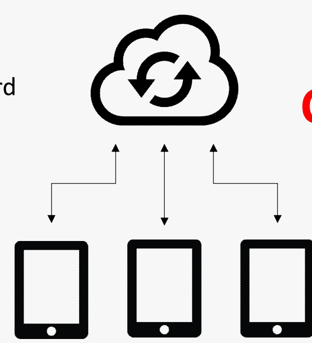


CHIMAC TECHNOLOGIES

Key Features

Coral is powered by a dedicated cloud service

- Real-time data access
- Automated backups
- Fully functional offline
- Scalable
- Unique login / password



FedRAMP Certified !!!

CHAAC TECHNOLOGIES

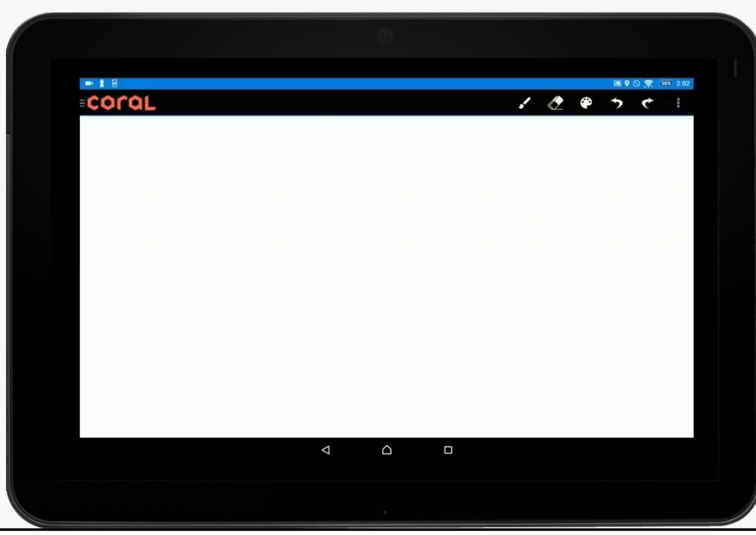
Innovation

New way to explore your data with the Data Viewer

CHAAC TECHNOLOGIES

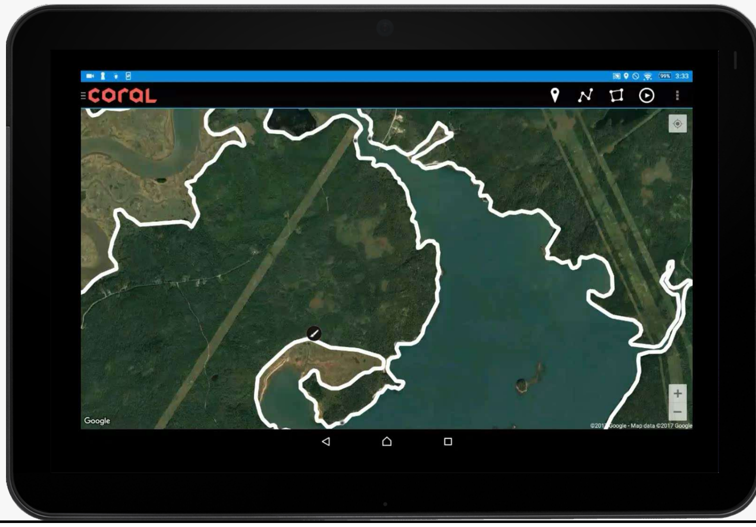
Innovation

All medias are integrated and georeferenced

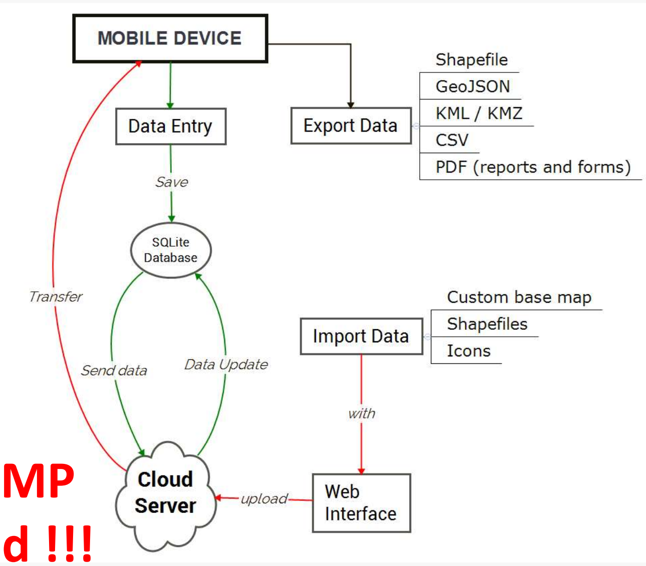


Innovation

Link your medias to a specific feature



Data Flow



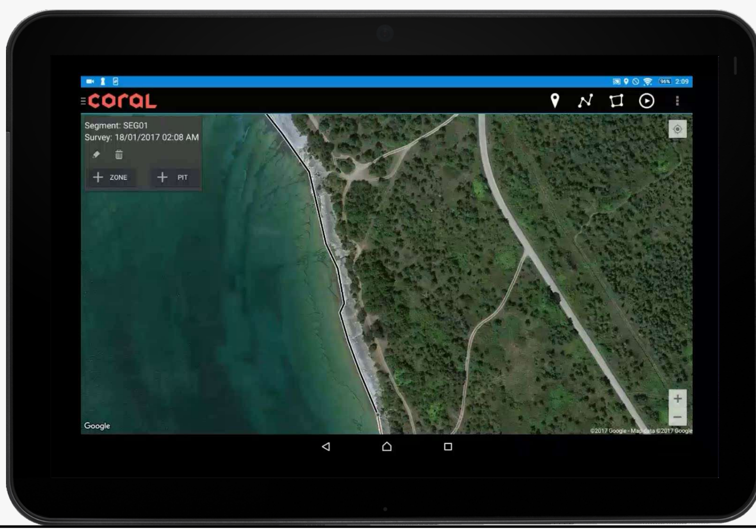
FedRAMP Certified !!!

Alignment with NOAA standards

Required spatial topology : snap to algorithm

Alignment with NOAA standards

Required spatial topology : zone builder



CHAAC TECHNOLOGIES

Impact of NOAA standards

Just a matter of creating new forms for the data model

CHAAC TECHNOLOGIES

THANK YOU!

President

Guillaume Nepveu is an electrical engineer and he holds a master degree in Applied Mathematics. Guillaume acted as a data manager and GIS specialist during 5 spills. He is the head designer and the development manager of Coral.

Technical Advisor

Alain Lamarche is a recognized expert in oil spill response management systems. Alain acted as a data manager during more than 10 spills in North America and New Zealand, including the BP Deep Horizon incident in the Gulf of Mexico (2010-2014)

SCAT FOR TOMORROW WORKSHOP

POLARIS INTEGRATED SCAT MANAGEMENT (PRISM) APPLICATION

18-19 January 2017
Mobile, AL

PRESENTATION OBJECTIVES

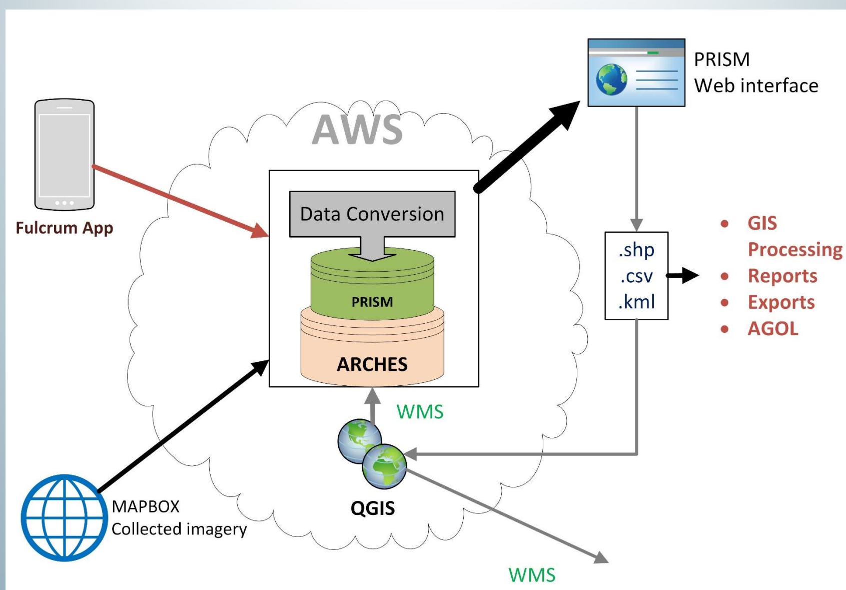
- *Describe the key features of your SCAT product?*
- *What are the innovative/novel approaches associated with your SCAT product?*
  - *New data being collected*
  - *New SCAT Information Product ideas*
- *How does the data flow in your SCAT product?*
- *What features of your SCAT product align with the proposed NOAA SCAT Data Standard?*
- *What impact might the proposed NOAA SCAT Data Standard have on your product?*

DESCRIBE THE KEY FEATURES OF YOUR SCAT PRODUCT?

- Desire to increase *efficiency* of collection/processing and *decrease errors* associated with SCAT data
- Reviewed a variety of products (3rd party data collection apps, SCAT specific apps)
- Determined that the database was the key component missing from most options
- Developed a web based SCAT database which currently uses a 3rd party mobile application for data collection

1

DESCRIBE THE KEY FEATURES OF YOUR SCAT PRODUCT?



2

WHAT ARE THE INNOVATIVE/NOVEL APPROACHES ASSOCIATED WITH YOUR SCAT PRODUCT?

- Mobile data collection
- Web based database as source for **all** SCAT field data (forms, photos, tracklines, scanned documents) with user permissions and edit tracking
- Ability to search for SCAT data/reports/photographs based on attributes, location or time
- Data work flow

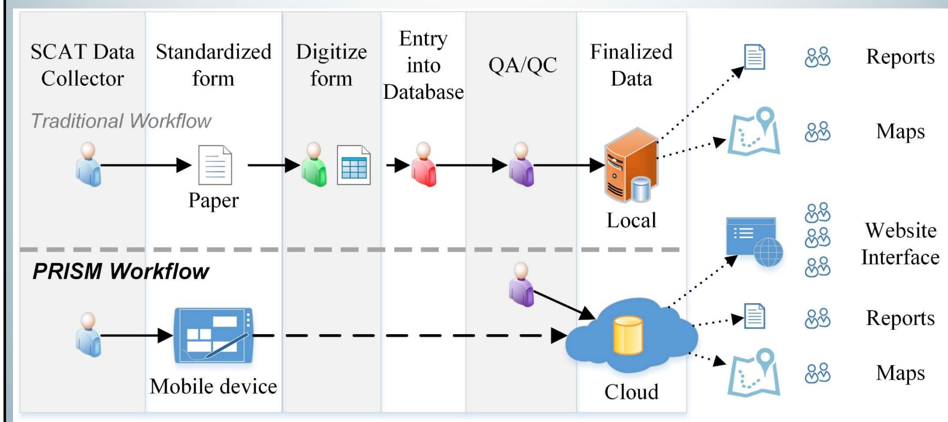
3

HOW DOES THE DATA FLOW IN YOUR SCAT PRODUCT?

- Data loaded into PRISM from mobile devices
- Reviewed by Team Leads in PRISM
  - ➢ Can add new data or edit data collected in field
  - ➢ "Draw" zone geometry, upload tracklines
- Reviewed by Data Manager
- Made available for other to see ("published")
- Searched/printed/exported by any logged in users
- Spatial data processed outside of PRISM for additional reporting requirements

4

HOW DOES THE DATA FLOW IN YOUR SCAT PRODUCT?



- Increase efficiency
- Decrease errors

5

WHAT FEATURES OF YOUR SCAT PRODUCT ALIGN WITH THE PROPOSED NOAA SCAT DATA STANDARD?

WHAT IMPACT MIGHT THE PROPOSED NOAA SCAT DATA STANDARD HAVE ON YOUR PRODUCT?

- In general, PRISM aligns well with the standards, mainly developed after DWH which was also our impetus for a new system
- Model and relationships are the same: survey, segments, zones, pits, etc.
- Stored spatial data would be field data, processed outside in a GIS for topological correctness and relationships
- Naming conventions are not exactly the same but can easily adjust export mapping to align
- Need to finalize metadata/documentation aspects

6

CONTACT

STEPHAN GMUR
sgmur@polarisappliedsciences.com
206.778.6875

POLARIS APPLIED SCIENCES INC.
www.polarisappliedsciences.com
425.823.4841

The Response Group
Emergency Response | Pre-Planning & Support

TRG Recon
SCAT Mobile Application

IAP Software - Developed for Responders by Responders

Your ability to respond is our shared responsibility ™

TRG Software Integration

The Response Group
Emergency Response | Pre-Planning & Support

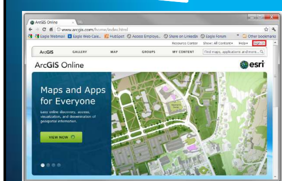
Fully integrated, single code base core platform

Common Operating Picture

The Response Group
Emergency Response | Pre-Planning & Support

Mobile Data Collection
- Displays real-time updates
- Data collection from the field

GIS Specialists
- Create and Edit data from Command Post
- QA/QC field data collected



Integration
- Fully integrated with all TRG products including IAP

Interoperability
- ERMA, ArcGIS Portal\Online
- Uses OGC standard formats

TRG Recon

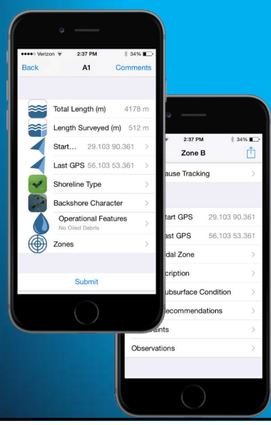
The Response Group
Emergency Response | Pre-Planning & Support

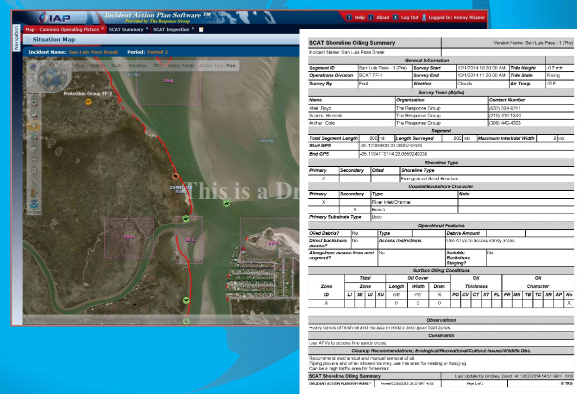
- Mobile app for data collection in the field
- Offline capability with cached maps
- Management of SCAT Teams & assignments
- NOAA Shoreline Assessment Manual integration for quick reference

TRG Recon - SCAT

The Response Group
Emergency Response | Pre-Planning & Support

- Direct integration with IAP Software and Common Operating Picture
- Populate NOAA Shoreline Oiling Summary forms in the field using data collected from mobile devices
- Map SCAT Segments with mobile device tracking

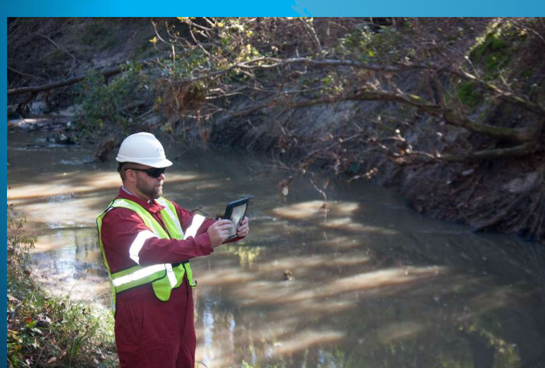


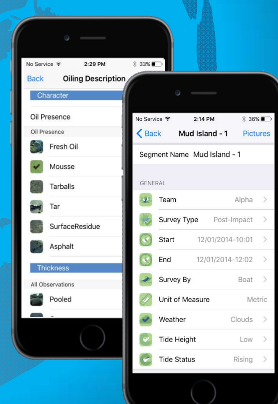


Application Inputs

The Response Group
Emergency Response | Pre-Planning & Support

- General Information
- Survey Team Members
- Segment Name
- Shoreline Types
- Coastal/ Backshore Characteristics
- Surface Oiling Conditions
- Subsurface Oiling Conditions
- Observations
- Constraints
- Cleanup Recommendations
- GPS Tracking
- Pictures

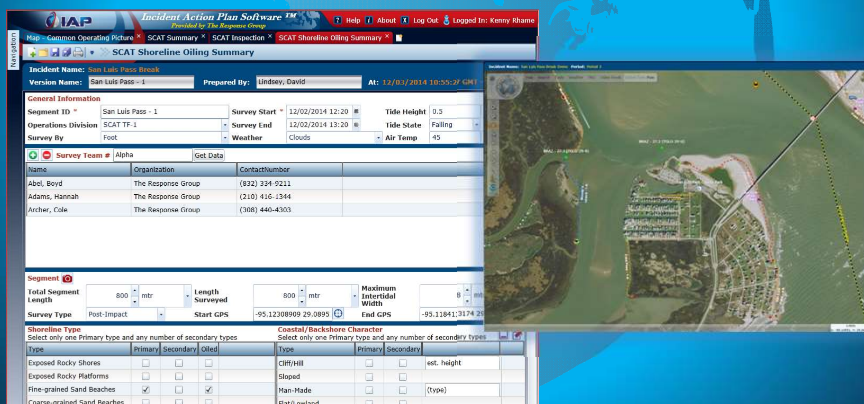




Outputs

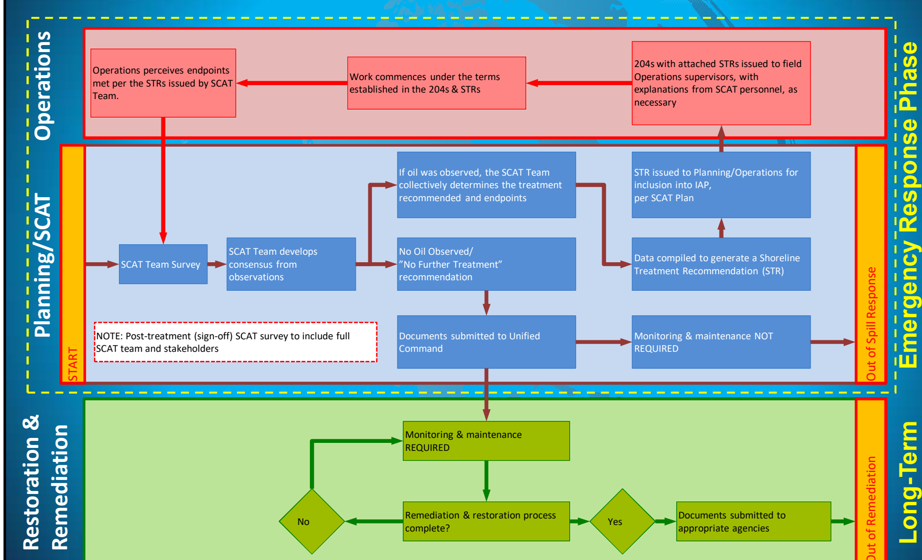
The Response Group
Emergency Response | Pre-Planning & Support

- Populated NOAA SOS Forms and reports
- Photographs for each survey, segment, pit or trench
- Georeferenced data and attributes
- Common Operating Picture – using standard colors and symbols
- Generate STR using data from SOS form



SCAT Process Flowchart

The Response Group
Emergency Response | Pre-Planning & Support



Integrating with Command Post

The Response Group
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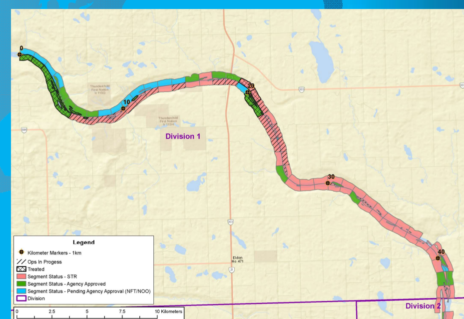
- STR provided to Operations for cleanup recommendations
- Operations cross reference STR with ICS 204
- Daily reports from Operations on waste collection and ICS 204 status
- Unified Command briefing using Dashboards & Common Operating Picture



The Response Group
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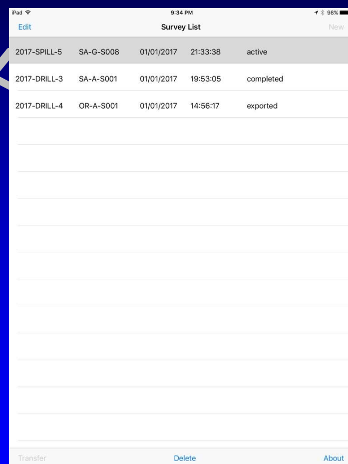
IAP

Questions/Comments?

IAP Software - Developed for Responders by Responders

Your ability to respond is our shared responsibility ™

SCATalogue iOS app



Describe the key features of your SCAT product?

- ✓ All NOAA Shoreline SCAT (SOS) form data captured
- ✓ Exports data to JSON / GeoJSON format
- ✓ SCATalogue data can be used by any software that can read JSON/GeoJSON format
- ✓ Photos, sketch, photo annotation option
- ✓ ArcGIS custom toolbox process into file geodatabase(s)
- ✓ iOS app on iPad mini (8” screen)
- ✓ NOO zones can either be explicit or inferred
- ✓ Multiple ways to push data: email, USB flash, cloud (AirDrop, dropbox, OneDrive, Google Drive, etc)
- ✓ Currently, pull of data is from CDFW FTP (team list only)
- ✓ Team lists can also be created via iOS contacts and ad hoc
- ✓ Shoreline representation and/or segments can be generated by ArcGIS using SCATalogue GPS tracklog
- ✓ When shoreline segments available, oiling zones are snapped to them
- ✓ Currently not… but thought being given to making SCATalogue generic (aka not California specific)

What are the innovative/novel approaches associated with your SCAT product?

New data being collected
New SCAT Information Product ideas

- Nothing new under the sun
- Standard data from NOAA SOS form

- The obvious is electronic data collection with associated technological benefits
  - Data already in digital format
  - Form centric which mirrors what users are used to over these many years
  - Form centricity and familiarity reduces learning curve
  - GPS
  - Sketch
  - Photos
  - Sketch overlay on photos
  - App map form provided but not developed as of yet

How does the data flow in your SCAT product?

- Collection-wise; basically the same flow as on the standard data from NOAA SOS form

- Data can be transferred
  - via email
  - via Apple airdrop
  - via cloud (dependent on user/organization)
  - via flash (dependent on user/organization)
  - via third party app such as AirTransfer (dependent on user/organization)

- OSPR GIS unit processing into ESRI file geodatabase (individual survey-segment)
- QA/QC*
- OSPR GIS unit processing into ESRI SQL geodatabase (spill compilation)*

- ICP and other mapping products
- Posting to ERMA

* Workflow being developed

What features of your SCAT product align with the proposed NOAA SCAT Data Standard?

Aligns with NOAA SOS form so fairly good alignment

- Items that are different but can be addressed
  - Suggested field names are similar but do not match (can be field mapped)
  - Survey and Segment elements combined vs decoupled
  - SCATalogue designed for Survey-Segment data collection however multiple segment collection can be processed

  - Survey records team number with associated team table with person(s)
  - Segment secondary ESI raw data is ; delimited and oiled indicated by *
  - Segment backshore type / character is ; delimited
  - SOO has primary and secondary tidal zones (vs average/dominant)
  - SOO distribution uses codeset (C;B;P;S;T)
  - SOO thickness uses codeset (TO;CV;CT;ST;FL;NO) – primary/secondary
  - SOO does not have substrate attribute

What features of your SCAT product align with the proposed NOAA SCAT Data Standard? (continued)

- Items that are different but can be addressed
  - SOO unit area has <1% option
  - SOO average size has <1 cm option
  - SOO has discrete oiling type but codes vary
  - SOO does not have plant oiling top/bottom attributes
  - SOO need clarification on type of discrete oiling vs category

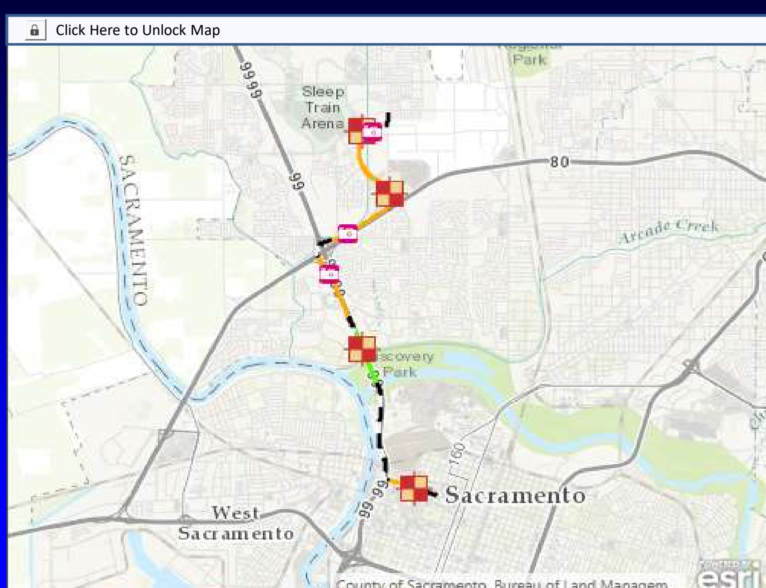
  - SSOO tidal zone uses 2 letter abbreviations (TZ redundant?)
  - SSOO depth values are integers (whole cm)
  - SSOO character: SAP = AP?, has TB
  - SSOO uses % distribution entry (codes?)
  - SSOO category (computation?)
  - STR has all elements except: issue date, completion date, and replaced by.
  - STR constraints/concerns are in one ‘notes’ attribute field
  - STR recommendations are ; delimited

What impact might the proposed NOAA SCAT Data Standard have on your product?

- Depends on how standard the voluntary standard is/becomes
- CDFW OSPR plans to use geodatabase(s) rather than shapefile(s)
  But… will need shapefile output for ERMA
- Required spatial topology: ArcGIS topology rules?

- SCATalogue output (Json/GeoJson) can be manipulated so flexible without changes
- SCATalogue app may need coding changes and go thru Apple app processes
- OSPR's positive oil sighting protocol
- Stakeholder recommendations on SOO zone splitter/lumper balance
- Required spatial topology: ArcGIS topology rules?
- SCATalogue may not the logical relationship QA/QC standard on bullet item four.
  "…at least one child record in the data table containing information about surface oiling observations or subsurface oiling observations made in that survey". This is because if there is NOO, SCATalogue has a 'NOO' checkbox on its Segment form. This makes it unnecessary to create a SOO and SSOO to record a NOO condition for the Survey. (a shortcut)
  HOWEVER, both SOO and SSOO forms do have and allow recording of a NOO condition.

SCATalogue in AGOL



RAPID ASSESSMENT TOOL

CTEH LLC

SCAT FOR TOMORROW WORKSHOP

Brady Davis
Daniel White

RAPID ASSESSMENT TOOL

Originated in January 2015

Rapid, visual qualitative evaluation of shoreline conditions based on elements consistent with SCAT

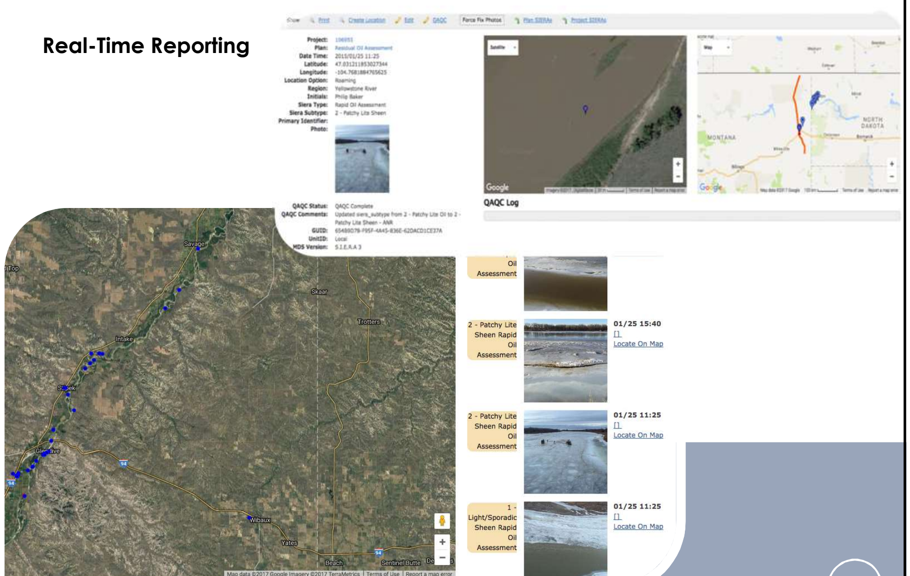
Survey/Oiling Summary

Use Simultaneously with SCAT

2

DESCRIBE THE KEY FEATURES OF YOUR SCAT PRODUCT?

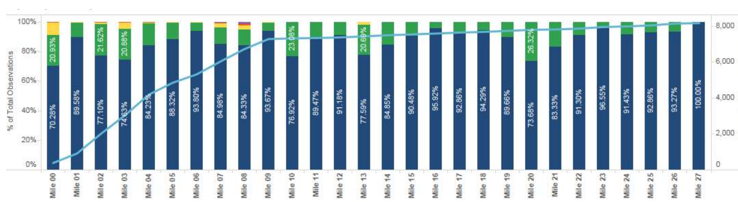
Real-Time Reporting



3

DESCRIBE THE KEY FEATURES OF YOUR SCAT PRODUCT?

Advanced Data Visualizations



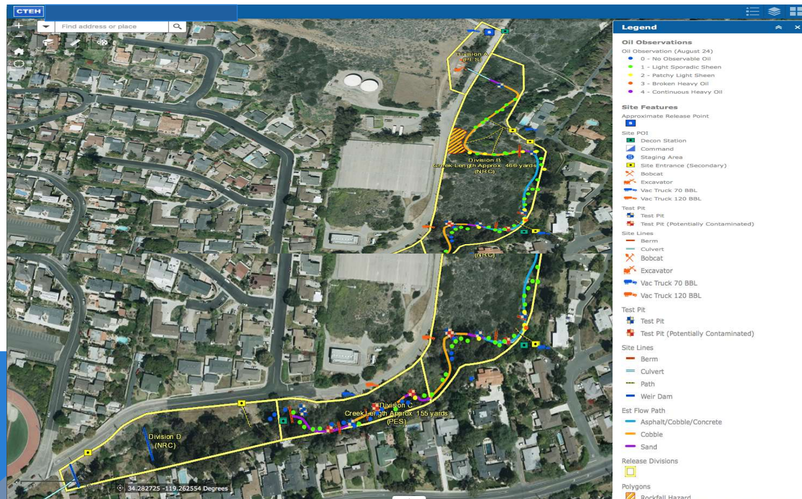
River Mile	0 - No Observable Oil		1 - Light/Sporadic Sheen		2 - Patchy Lite Sheen		3 - Broken Heavy Oil		4 - Continuous Heavy Oil		Grand Total	
	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total	Count	% of Total
Mile 00	272	70.28%	81	20.93%	32	8.27%	2	0.52%	0		387	100.00%
Mile 01	473	89.58%	52	9.85%	3	0.57%	0		0		528	100.00%
Mile 02	845	77.10%	237	21.62%	12	1.09%	2	0.18%	0		1,096	100.00%
Mile 03	765	74.63%	214	20.88%	45	4.39%	1	0.10%	0		1,025	100.00%
Mile 04	972	84.23%	169	14.64%	11	0.95%	2	0.17%	0		1,154	100.00%
Mile 05	582	88.32%	75	11.38%	2	0.30%	0		0		659	100.00%
Mile 06	439	93.80%	28	5.98%	1	0.21%	0		0		468	100.00%
Mile 07	611	84.98%	80	11.13%	21	2.92%	5	0.70%	2	0.28%	719	100.00%
Mile 08	581	84.33%	72	10.45%	21	3.05%	6	0.87%	9	1.31%	689	100.00%
Mile 09	518	93.67%	34	6.15%	1	0.18%	0		0		553	100.00%
Mile 10	30	76.92%	9	23.08%	0		0		0		39	100.00%
Mile 11	17	89.47%	2	10.53%	0		0		0		19	100.00%
Mile 12	31	91.18%	3	8.82%	0		0		0		34	100.00%
Mile 13	45	77.59%	12	20.69%	1	1.72%	0		0		58	100.00%
Mile 14	56	84.85%	10	15.15%	0		0		0		66	100.00%
Mile 15	38	90.48%	4	9.52%	0		0		0		42	100.00%
Mile 16	47	95.92%	2	4.08%	0		0		0		49	100.00%
Mile 17	52	92.86%	4	7.14%	0		0		0		56	100.00%
Mile 18	33	94.29%	2	5.71%	0		0		0		35	100.00%
Mile 19	52	89.66%	6	10.34%	0		0		0		58	100.00%
Mile 20	42	73.68%	15	26.32%	0		0		0		57	100.00%
Mile 21	20	83.33%	4	16.67%	0		0		0		24	100.00%
Mile 22	42	91.30%	4	8.70%	0		0		0		46	100.00%
Mile 23	84	96.55%	3	3.45%	0		0		0		87	100.00%
Mile 24	32	91.43%	3	8.57%	0		0		0		35	100.00%
Mile 25	52	92.86%	4	7.14%	0		0		0		56	100.00%
Mile 26	97	93.27%	7	6.73%	0		0		0		104	100.00%
Mile 27	19	100.00%	0		0		0		0		19	100.00%
Grand Total	6,847	83.89%	1,136	13.92%	150	1.84%	18	0.22%	11	0.13%	8,162	100.00%

4 - Continuous Heavy Oil | 3 - Broken Heavy Oil | 2 - Patchy Lite Sheen | 1 - Light/Sporadic Sheen | 0 - No Observable Oil

4

DESCRIBE THE KEY FEATURES OF YOUR SCAT PRODUCT?

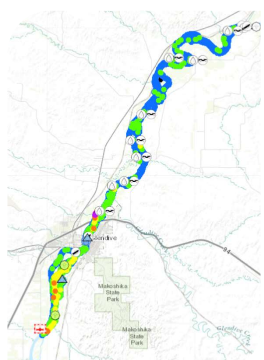
ICS Support

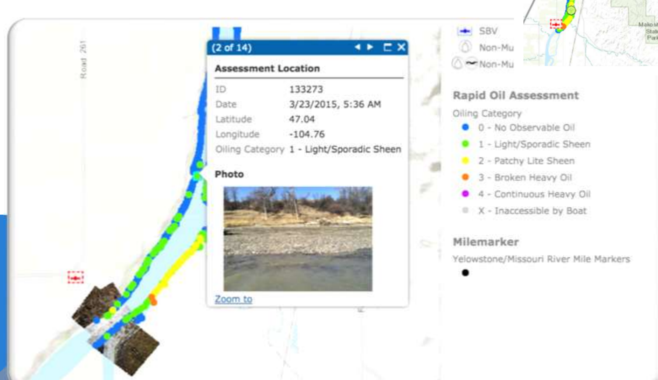


5

USE CASE - OIL

- **27 Miles of Yellowstone River**
- **8162 Observations**
- **2 Teams of 3 People**
- **5 Days**

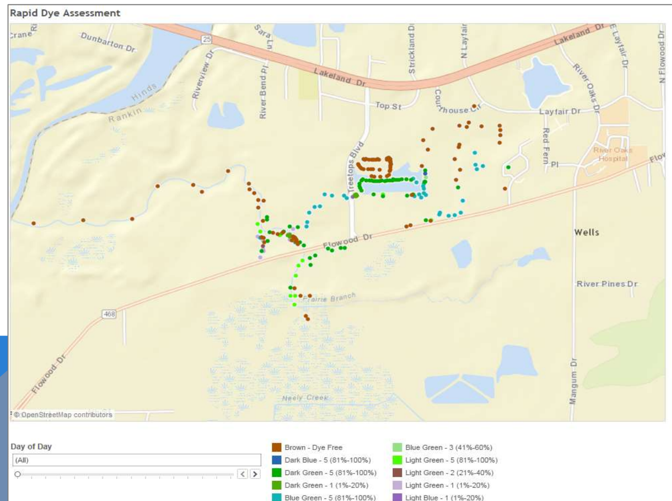




6

USE CASE - DYE

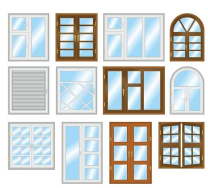
- **224 Observations**
- **2 People**



7

WHAT ARE THE INNOVATIVE/NOVEL APPROACHES ASSOCIATED WITH YOUR SCAT PRODUCT?

Scalable/Customizable App



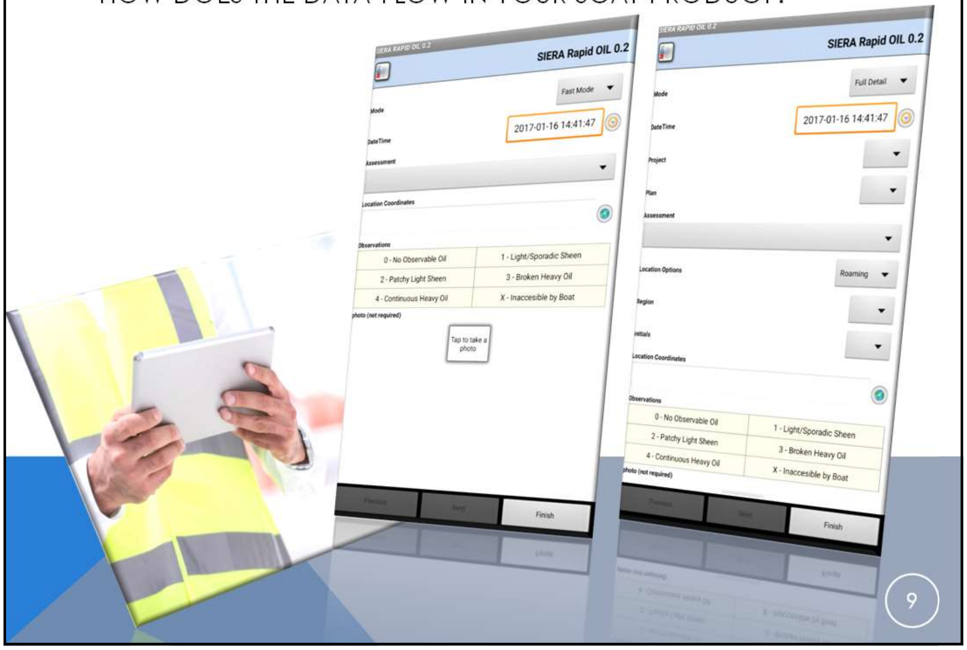
Flexible Mobile Framework

"Bring Your Own Device"

Offline Data Capture

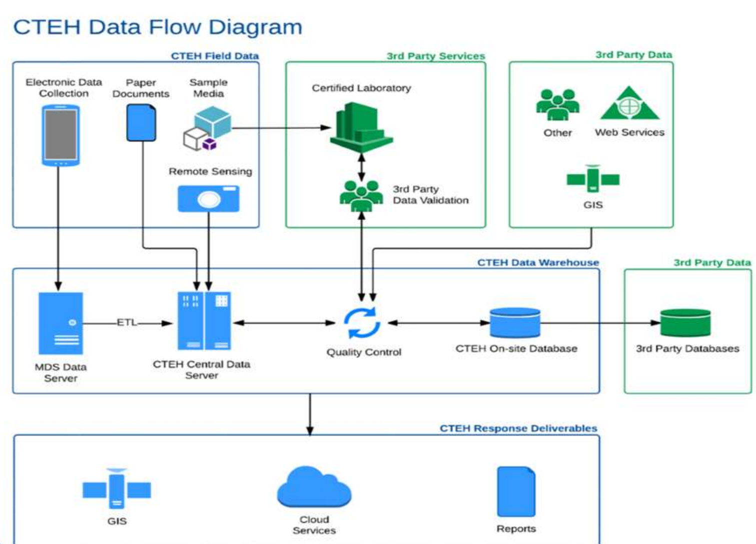
8

HOW DOES THE DATA FLOW IN YOUR SCAT PRODUCT?



9

HOW DOES THE DATA FLOW IN YOUR SCAT PRODUCT?



10

WHAT FEATURES OF YOUR SCAT PRODUCT ALIGN WITH THE PROPOSED NOAA SCAT DATA STANDARD?

Certain Attributes for Survey data collection

File formats for data exchange

11

WHAT IMPACT MIGHT THE PROPOSED NOAA SCAT DATA STANDARD HAVE ON YOUR PRODUCT?

Additional Attributes

Multiple Survey Personnel, Survey Method, Tide Height, etc..

Additional Valid Values

Edit column names to align with suggested column names

Guidance tool for any future development

12

DANIEL WHITE

CTEH, LLC
Project Data Manager
501.240.8422
dwhite@cteh.com

13

Proposed NOAA SCAT Data Standard

Zach Nixon

SCAT for Tomorrow Workshop

1/18/2017

Components

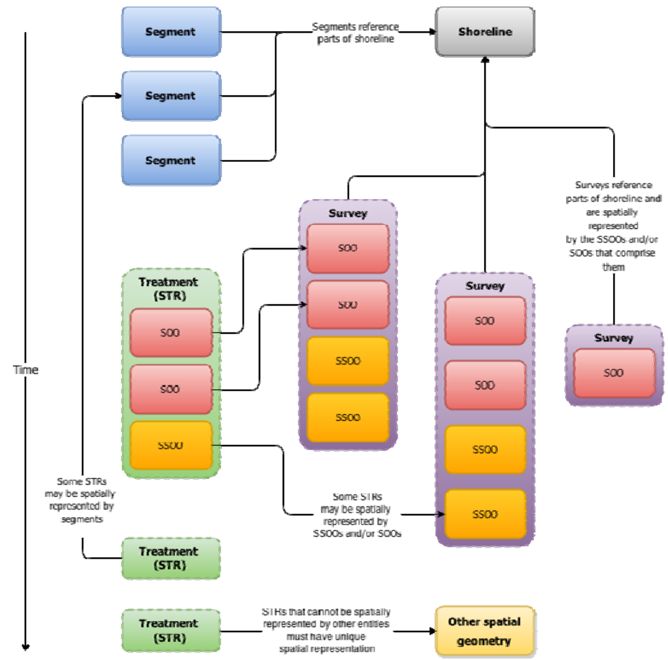
- Conceptual entities
- Spatial representations
- Tabular attributes
- Logical relationships
- Spatial relationships
- Documentation

Overview

- Facilitates interoperability, clarity, and transparency for digital SCAT data
- ***Not*** an application, database, data structure, or entity-relationship model
- Includes ***simple, core elements*** only
- ***Extensible*** for requirements of different specific incidents
- Standard is ***software agnostic***
- ***Only parts may apply*** to individual data digital data collection or storage applications
- Applies to digital data across ***full range*** of incident and software complexity, and dataset sizes

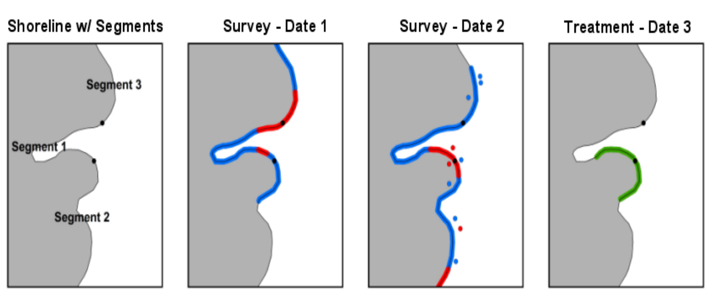
Conceptual Entities

- Shoreline
- Segments
- Surveys
- Surface Oiling Observations (Zones)
- Subsurface Oiling Observations (Pits)
- Shoreline Treatment Recommendations (STRs)
- Additional elements required for a specific incident



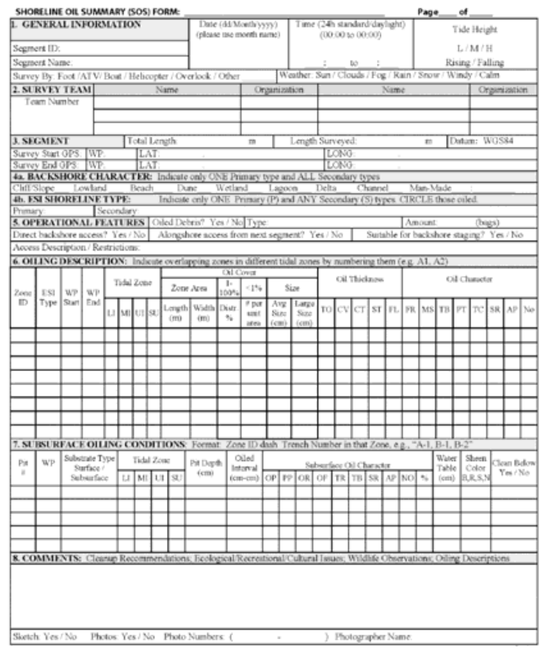
Spatial Representation

- Shoreline
- Segments
- Surface Oiling Observations (Zones)
- Subsurface Oiling Observations (Pits)



Tabular Attributes

- Replicate NOAA CSOS form
- Add elements from wetland form



SHORELINE OIL SUMMARY (SOS) FORM: ____ Page ___ of ___

1. GENERAL INFORMATION | Date (dd/Month/yyyy) (please use month name) | Time (24h standard/daylight) (00:00 to 00:00) : to : | Tide Height L / M / H Rising / Falling

Segment ID:

Segment Name:

Survey By: Foot /ATV/ Boat / Helicopter / Overlook / Other ____ | Weather: Sun / Clouds / Fog / Rain / Snow / Windy / Calm

2. SURVEY TEAM | Name | Organization | Name | Organization

Team Number

3. SEGMENT | Total Length: m | Length Surveyed: m | Datum: WGS84

Survey Start GPS: | WP: | LAT: | LONG:

Survey End GPS: | WP: | LAT: | LONG:

4a. BACKSHORE CHARACTER: Indicate only ONE Primary type and ALL Secondary types

Cliff/Slope Lowland Beach Dune Wetland Lagoon Delta Channel Man-Made

4b. ESI SHORELINE TYPE: Indicate only ONE Primary (P) and ANY Secondary (S) types. CIRCLE those oiled.

Primary: | Secondary:

5. OPERATIONAL FEATURES | Oiled Debris? Yes / No | Type: | Amount: (bags)

Direct backshore access? Yes / No | Alongshore access from next segment? Yes / No | Suitable for backshore staging? Yes / No

Access Description / Restrictions:

6. OILING DESCRIPTION: Indicate overlapping zones in different tidal zones by numbering them (e.g. A1, A2)

Zone ID	ESI Type	WP Start	WP End	Tidal Zone				Oil Cover: Zone Area		1-100%	<1%	Size		Oil Thickness					Oil Character							
				LI	MI	UI	SU	Length (m)	Width (m)	Distr. %	# per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No

7. SUBSURFACE OILING CONDITIONS: Format: Zone ID dash Trench Number in that Zone, e.g., "A-1, B-1, B-2"

Pit #	WP	Substrate Type Surface / Subsurface	Tidal Zone				Pit Depth (cm)	Oiled Interval (cm-cm)	Subsurface Oil Character										Water Table (cm)	Sheen Color B,R,S,N	Clean Below Yes / No
			LI	MI	UI	SU			OP	PP	OR	OF	TR	TB	SR	AP	NO	%			

8. COMMENTS: Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions

Sketch: Yes / No Photos: Yes / No Photo Numbers: (-) Photographer Name:

Tabular Attributes

- Adds:
  - Surface oiling substrate (sediment, vegetation canopy, or both)
  - Height of oiling on plants (slightly changed from NOAA wetland form)
- Extensible (can add attributes and codes)
- No required field naming conventions
- Subset of attributes required to be collected by survey personnel at time of survey

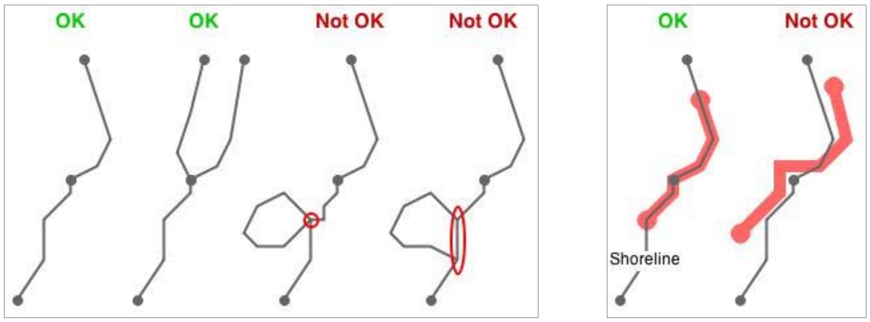
Logical Relationships

- Base requirements:
  - Spatial features describing zones/pits should have corresponding record in the data tables & vice versa
  - All tabular records describing zones/pits should have a parent record in the data tables describing survey
  - All tabular records describing surveys are required to have at least one child record in the data table describing zones/pits (at least NOO)
- Extensible (may be added for robust QAQC)
- Standard does not specify when/where these are enforced

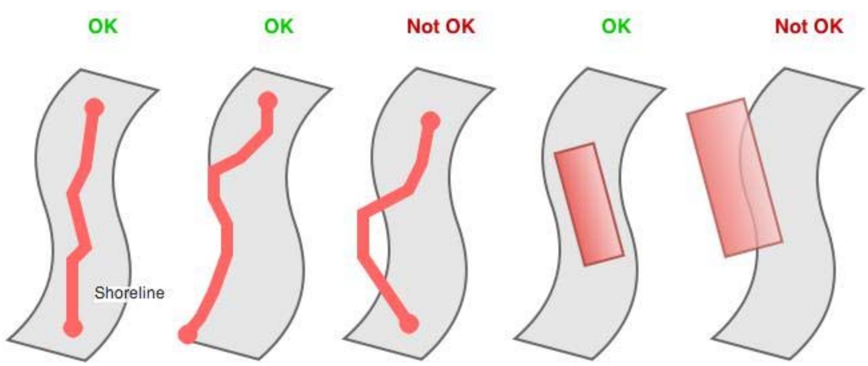
Spatial Relationships

- Spatial topology – may seem like technical detail, but is critical for calculation of basic SCAT metrics and products
- Examples:
  - Linear features must not self-cross or self-overlap
  - Linear features must overlap with a linear shoreline
  - Linear features must not cross other linear features of the same type but may overlap other linear features of the same type.
- Extensible – can add rules to meet need of response
- Standard does not specify when/where these are enforced – but generally needs to be done routinely for basic SCAT functions

Spatial Relationships



Spatial Relationships



Documentation

- Documentation sufficient for external users is required
- But, no format is specified
- Suggested:
  - Federal Geospatial Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (FGDC, 1998)
  - ISO 19115 (ISO, 2014)
  - Project Open Data Metadata Schema v1.1 (POD, 2015)

Questions for Discussion

- Attributes to remove as required (e.g. backshore character, etc.)?
- Missing core attributes?
- Should STRs be a required entity?
- Role of segments, and potential efforts to decouple segments from oiling, status tracking, etc.
- Still a case for non-spatial pits/zones?

WELCOME BACK

NOAA's GOM Disaster Response Center

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Agenda: Thursday, January 19

0830 Recharge & Recalibrate
0845 Breakout Group Session II
1030 *Break*
1045 Group Report Outs
1145 *Lunch*
1315 Plenary Discussion: Best Practices
1430 *Break*
1445 Plenary Discussion: Path Forward
1530 General Impressions & Takeaways
1600 Closing Remarks
1630 Adjourn

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Breakout Session II

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Group A: Technical Components of Data Standard

SCAT data managers and software developers

- **Discuss segmentation and pre-segmentation.**
- **What can be removed from the data standard? What is missing?**
- **Are there ideas about collecting data a certain way that the data standards would not allow?**
- **If we recommend a data exchange format, what should the format data be, including attributes and spatial information?**
- **Should we recommend a format for transmission from the field to the Unified Command, and/or transmission as part of a data package to external users?**
- **What are the best practices with respect the SCAT Data Standard?**

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Group B: Data Handling and Exercise Development

SCAT Customers & Practitioners

- What are the data sharing plan expectations for SCAT package transfer/exchange?
- What are the logistics of managing the SCAT package transition as part of data sharing?
- What should be in that package (high level)?
- What are the expectations for SCAT products and timing of production?
- What are the best practices with respect to data handling and exercise development?

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Group C: QA/QC and Data Flow

SCAT Coordinators

- What are the expectations for data and product quality review and approval in the workflow process?
- How does that fit into future workflows?
- What are the expectations for SCAT products and timing of production?
- What are the best practices with respect to QA/QC and data flow?

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Breakout Session II

Group A: Technical Q&A of the Data Standard	Group B: Data Handling and Exercise Development	Group C: QA/QC and Data Flow
Software developers & SCAT data managers	**SCAT Customers & Practitioners**	**SCAT Coordinators**
Lead: Ben Shorr	**Lead: Mark Miller**	**Lead: Charlie Henry**
Recorder: Whitney Hauer	**Recorder: Katie Krushinski**	**Recorder: Kathy Mandsager**
Brady Davis, CTEH	Steve Alexander, USFWS	Carl Childs, NOAA
Kate Doiron, IEC	Jeff Arnett, Shell	Richard Davi, ExxonMobil
Stephan Gmur, Polaris	Steve Buschang, TXGLO	Rob Holland, OSRL
Dominque Goyer, TRIOX	Marty Cramer, Conoco	Sheridan McClellan, USCG
Michael Greer, Genwest	JoAnne Hanson, USCG	Ed Owens, Owens Consulting
Alain LaMarche, TRIOX	JB Huyett, Genwest	Chris Pfeiffer, CARDNO
Chris Locke, RPI	Michele Jacobi, NOAA	Florence Poncet, CEDRE
Andrew Milanes, ES2	Sonja Larson, WAECY	Robert Simmons, ES2
Guillaume Nepveu, CHAAC	Stephane Leblanc, EC	Elliott Taylor, Polaris
Zach Nixon, RPI	Judd Muskat, CA OSPR	Dave Wesley, NOAA
Isaac Oshima, CAOSPR	Dave Palandro, ExxonMobil	Mark Whittington, ITOPF
Kenny Rhame, TRG	Timyn Rice, FLFWS	Scott Zengel, RPI
Dan White, CTEH	Marla Steinhoff, NOAA ARD	
Robb Wright, NOAA ARD	John Tarpley, NOAA	
	Kathleen Thomas, Chevron	

7

Plenary Discussion: Path Forward

- What would you consider "metrics of success "with respect to the outcomes discussed at this workshop within:
  - 6 months?
  - 1 year?
  - 3 years?

SCAT for Tomorrow Workshop, January 18 & 19, 2017

Appendix E: List of Breakout Groups

SCAT for Tomorrow - Breakout Groups			
Group A **Lead: Zach Nixon** Recorder: Katie Krushinski	Group B **Lead: John Tarpley** Recorder: Whitney Hauer	Group C **Lead: Mark Miller** Recorder: Kathy Mandsager	Group D **Lead: Michele Jacobi** Recorder: Michael Greer
Carl Childs	**Ben Shorr**	**Charlie Henry**	**Dave Wesley**
Steve Alexander, FWS	Jeff Arnett, Shell	Domique Goyer, TRIOX	Steve Buschang, TXGLO
Anton Avguchenko, CTEH	Richard Davi, ExxonMobil	Katie Doiron, IEC	Stephan Gmur, Polaris
Nick Brescia, USEPA	JoAnne Hanson, USCG	Sonja Larson, WAECY	Kenneth Kumenius, SCATMAN
Marty Cramer, Conoco	Rob Holland, OSRL	Stephane Leblanc, EC	Chris Pfeifer, CARDNO
Andy Graham, Polaris	Alain LaMarche, TRIOX	Chris Locke, RPI	Florence Poncet, CEDRE
Gary Harmon, CARDNO	Isaac Oshima, CAOSPR	Sheridan McClellan, USCG	Joe Schaefer, USEPA
JB Huyett, Genwest	Ed Owens, OWENS	Andrew Milanes, ES2	Robert Simmons, ES2
Kenny Rhame, TRG	Fernando Terceros, TRG	Judd Muskat, CA OSPR	Kathleen Thomas, Chevron
Timyn Rice, FLFWS	Dan White, CTEH	Guillaume Nepveu, CHAAC	Caitlin Wessel, Marine Debris
Elliott Taylor, Polaris	Scott Zengel, RPI	David Palandro, ExxonMobil	Robb Wright, NOAA ARD
Mark Whittington, ITOPF		Marla Steinhoff, NOAA ARD	

SCAT Breakout Group - Day 2		
Group A: Software developers / SCAT data managers	**Group B: Practitioners/SCAT customers**	**Group C: SCAT Coordinators**
Lead: Ben Shorr	Lead: Mark Miller	Lead: Charlie Henry
Recorder: Whitney Hauer	Recorder: Katie Krushinski	Recorder: Kathy Mandsager
Brady Davis, CTEH	Steve Alexander, USFWS	Carl Childs, NOAA
Kate Doiron, IEC	Jeff Arnett, Shell	Richard Davi, ExxonMobil
Stephan Gmur, Polaris	Steve Buschang, TXGLO	Rob Holland, OSRL
Dominque Goyer, TRIOX	Marty Cramer, Conoco	Sheridan McClellan, USCG
Michael Greer, Genwest	JoAnne Hanson, USCG	Ed Owens, Owens Consulting
Alain LaMarche, TRIOX	JB Huyett, Genwest	Chris Pfeiffer, CARDNO
Chris Locke, RPI	Michele Jacobi, NOAA	Florence Poncet, CEDRE
Andrew Milanes, ES2	Sonja Larson, WAECY	Robert Simmons, ES2
Guillaume Nepveu, CHAAC	Stephane Leblanc, EC	Elliott Taylor, Polaris
Zach Nixon, RPI	Judd Muskat, CA OSPR	Dave Wesley, NOAA
Isaac Oshima, CAOSPR	Dave Palandro, ExxonMobil	Mark Whittington, ITOPF
Kenny Rhame, TRG	Timyn Rice, FLFWS	Scott Zengel, RPI
Dan White, CTEH	Marla Steinhoff, NOAA ARD	
Robb Wright, NOAA ARD	John Tarpley, NOAA	
	Kathleen Thomas, Chevron	

Appendix F: Breakout Session Notes

GROUP A: BREAKOUT SESSION I: CURRENT SCAT CAPABILITIES/NEEDS

Wednesday, January 18, 2017 at 3:00 PM

Breakout Session I: Current SCAT Capabilities/Needs

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **current concerns with respect to electronic data management for SCAT during oil spills**?

Notes:

- QAQC data (talked about, but no resolution) – find/develop standardized process and tagging system to determine the status of the data and reports.
    - When developing standards, specify the context in which it's intended and where it applies.
    - Ways to track changes to information.
    - Roles and steps
    - Include minimum items in QAQC process.
    - Who (users) is accessing the information and how/when is it being used?
    - Do we need to include information products that go out?
- Capture/define a scope of applicability. (tier 2 & 3)
- Who gets access, when, and to what degree?
- External access and generation of information products – only after data has been QAQC'd.

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **future needs for SCAT to improve readiness and efficacy**?

Notes:

- Information products
- Resist temptation to become more complex.
- Access, drones, dogs, and devices.
- Immediate data transfer from field and should it be separate from formal SCAT process.
- Other electronic data systems used in the field
- Outside data sources – understand what's available and the limitations on its use.
- Does the electronic data management need to take into account other consultations? (SHPO, wildlife)
    - Immediate response – SCAT access/restricted areas
    - STR consultation process
- Cheaper, faster, better – how to maintain standard, but accomplish cheaper, faster, better?
- Endpoints & NEBA

Additional Notes:

Notes:

GROUP B: BREAKOUT SESSION I: CURRENT SCAT CAPABILITIES/NEEDS

Wednesday, January 18, 2017 at 3:00 PM

Breakout Session I: Current SCAT Capabilities/Needs

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **current concerns with respect to electronic data management for SCAT during oil spills**?

Notes:

- Will also include collection in addition to data management
- There are situations where you will not able to use an electronic device on site; paper is the backup plan
- Current data collections capable to capture shoreline types (all environments, right now there is a focus on marine, not Arctic, riverine) – no, but can customize the drop downs
    - Question tidal zones – lower, upper, no middle?
- % distribution – numeric or category definition (or have both) – can take numeric to category, but not the other way around
- What are the data requirements that are needed? Then should all be able to go into single database - compatibility
- Do the current SCAT products have a standard suite of output (e.g., tabular, tied into GIS)? Is this now fluid? Still have the QA/QC process.
- QA/QC person collecting the data looking over the data is only part of the QA/QC; there are multiple SCAT teams. Step missing with the digital for the higher level QA/QC (you get this with the paper). Was it characterized properly? Appropriate method for STR? STR is the key product. Need to check at a higher level quickly.
- Concern of the dashboard
    - Executive Order for EPA for 24 h turnaround, labeled as preliminary data.
    - Provisional data – people can take it and then make bad decisions. Try to keep it in-house. In a database, can have any type of status assigned, but not currently being used. Also – approval. The STR, the implementation, and approval should all be a part.
- What is the database going to triage? Focus on STR – what are the STR criteria (spill specific criteria) that will drive STR; critical data line/shore line, mechanism to QA/QC for STR or no STR; database needs to be able to handle multiple phases of response for multi-seasons
- Data standard is critical because it controls data collection
- Black box vs. automation. Use FME (feature manipulation engine).
- Tracking – the field data package, comes in and tracked through the system tied together? Yes, better post DWH. The timeframe makes it difficult. NRDA file collection to gather of structured and unstructured, but critical to have upfront – the technology is there.
- NOAA has a data warehouse, working to incorporate data model. But need to have convos with partners – others are doing the processing. It provides a place for Archives.
- Data exchange – can't use cloud, USB, cloud (e.g., dropbox) for transfer of data

Group B
Breakout Session I: Current SCAT Capabilities/Needs
SCAT for Tomorrow Workshop

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **future needs for SCAT to improve readiness and efficacy**?

Notes:

- Data standard is a roadmap for data exchange (it's close); data exchange deliverable needs to be a part of the data standard
- Might want other categories for survey types (e.g., drones, canines)
- Need to reduce the paperwork in data entry/transfer (e.g., CAOSPR surveys NOO)
- Recommend process for QA/QC – validated, calibrated with confidence. This was done with paper, now skipping with digital. Some way to generate report so that can be reviewed

GROUP C: BREAKOUT SESSION I: CURRENT SCAT CAPABILITIES/NEEDS

Wednesday, January 18, 2017 at 3:00 PM

Breakout Session I: Current SCAT Capabilities/Needs

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **current concerns with respect to (collection and management) electronic data management for SCAT during oil spills**?

Notes:GROUP C

- Legal state: on electronic signatures? (i.e., docu-sign, pdf signature if original is saved)
- Is STR a true legal document?
    - SCAT plan needs guidelines for electronic signatures.
    - ESCAT form needs to automatically send out form for signature.
    - What is the requirement for endorsing the data collection?
- There are so many different applications how can they be compatible with existing incident management systems?
- The data standard should specify ESCAT and database coordination.
- End points: (i.e., when is the cleanup done). What level of cleanup applies? End points are localized.
- Minimal requirements: (in the transition) can it handle both paper plus digital inputs?
- Offline requirements: applications that are relying on internet; but you have no internet.
- Must be comfortable, user – friendly and easy for the field team to use.
- Make sure backup and redundancy is sufficient.
- Review output data and confirm that it is addressing the needs of end user and ease in creating output documents. Must output in GIS format.
- Different levels of security for access and control.
- **Versioning control of files.**
- Communicate plan for the data standards and implement.

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **future needs for SCAT to improve readiness and efficacy**?

Notes:

- Must be able to capture new forms of data (remote sensing and other data) outside of SCAT form.
- Training. Integrated into drills.
- What would be the composition of future SCAT team? Does it change? Add a data collection team member? Or train a specialist?
- Extract transform load – make it automated in order to produce products. Readiness is important and make standard output.
- Manage the transition from paper/old hands to new technology.
    - Electronic tools should not necessarily look like paper.
- Can we use big data (large sets of data) techniques in order to help SCAT?

Group C
Breakout Session I: Current SCAT Capabilities/Needs
SCAT for Tomorrow Workshop

- New processes for new data stream (i.e., drone).
- Limit amount of data (too many photos).
- Include a simple way to identify geo-referenced information for field data. Solocator is one way that can do this. It defines GPS coordinates, directional and places it on a map.
- Provide a direct download feed. Use web services as possible so as not to duplicate.

GROUP D: BREAKOUT SESSION I: CURRENT SCAT CAPABILITIES/NEEDS

Wednesday, January 18, 2017 at 3:00 PM

Breakout Session I: Current SCAT Capabilities/Needs

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **current concerns with respect to electronic data management for SCAT during oil spills**?

Notes:

- Trying to get away from paper form, what about the field notes. We still need to have things in our notebooks as backup. Going from field note to EDC. Field notes will probably not going away.
- Ability to add a start and end coordinate on the map "dropping a pin".
- Data redundancy. (If electronic fails, we have paper backups) Field notebook, gps unit, camera
- If the data goes in a server or db, how can we (field team) go back and look at the data? Who would own the data? A copy can be created
- You may lose some spatial information (GPS accuracy?). GPS may not be as accurate.
- Flexibility to create segments. Standardization or rules for creating segments? Not having the segments as being a key record ID?
- Database structure vs data standards
- What do mean by ownership of the data? FOSC signs the data sharing plan. There is a POC for the data provider
- Get into the weeds of the data sharing plan. (SCAT process) Drills
- Before sharing out, we want to make sure we have confidence in our QAQC. Invalided data can be shared out. Best practices
- Make sure the EDC have the ability to export a tracklog vs waypoint
- Automated QAQC that would let the user know data is incorrect? (ie. Zone is too long)
-

Based on the plenary presentations and your experience/expertise, what has not been articulated yet regarding **future needs for SCAT to improve readiness and efficacy**?

Notes:

- SCAT Products: are there more? Are we happy with current products created? (i.e. Miles of oiled shoreline, oiling shoreline extent, segment status review, progress tracker, etc.)
- Do we want to integrate jurisdictional boundaries within the SCAT shoreline? Goes back to the rules of creating segments.
- Rapid Assessment teams, those initial captured information, that might feed a higher data requirement (SCAT)
- Good information that lacks spatial data. Ability to georeference good notes and observations
- Drones and mobile devices with range finder will be coming. Will need best practices. Drone could be used for areas not accessible. Quality may not be as good?
- Interoperability. Making sure the mobile app / tool is compliant
- SCAT app is not a catch all (sampling form is separate, photodb is separate)
- Training opportunities (field teams and backend process (reports, product creation, data sharing plan)
- SCAT teams needs to know small changes in the form can make a big impact on the end product

(i.e. from light oiling to heavy oiling). Need to let them know what the critical pieces are

- Lazer finder – not used as often.
- Shoreline segment length is not filled out at times, its calculated through GIS
- Drone with an attached 180 camera, user can move the camera

Additional Notes:

Notes:

-

GROUP A: BREAKOUT SESSION II: TECHNICAL Q&A OF THE DATA STANDARD

Thursday, January 19, 2017 at 8:45 AM

Discuss segmentation and pre-segmentation.

Notes:

- Segments will evolve with multi-season response; this is a motivation to not have segment as a primary key/requirement (moving from record ID)
- You will need a method to re-compute, a way to date/record, of previous segments. Related to segments, **Recommend: keep versions, add the start and stop date**
- Inherent in the data model, there are data managers, and they do this
- How would you handle this in practice from a spatial operations perspective if segment changed in time (dynamic)? It depends on the workflow.
- What are you hanging on the segments? NOO surveys. Add start and end date attributes? If the geometry changes, you have to create a new segment.
- Group is less involved on the decision on pre-segmentation vs. segmentation. Pre-segmentation, you have something to start with, you have the ability to change in the field is needed. The Data Standard doesn't prevent this from happening. Pre-seg is suitable for e.g., California – logistics of getting people out, timing, etc.
- How do you address max oiling with duplicate segments? Take the oldest segment? It depends on the process for making the max oil map, pivoting and counting. In addition to the date, could also have an ID for new segments.

What can be cut from the data standard? What is missing?

Notes:

- What is essential – attributes used to produce products, e.g, oil maps
- Address tracking multi-season
- Info is coming from the NOAA forms, some more important than others (e.g., oiling observation) but what about shore access? This is often not filled out on forms, does it belong in the standard? Yes, if on the form it should be on the standard, whether it's actually collected is different.
- You can get other information into the database that's not being collected in the field, e.g., tide level.
- Standard is focused on marine wrt to NOAA's interest. Can "de-marine" the standard to open up to other environments, e.g., freshwater
- Make list extensible/collapsible with some delimiter (when you exchange it, either give rules, or give a flat structure). The data standard does not have recommendation for data exchange.
- Recommend: report lat/long for observation point? Could go either way, often report lat/long. It may complicate the process if there is a conflict, but it is a backup. Could be used as an audited. **Recommend start and stop lat/long for a line.** Standard does not recommend a point or line, just include geometry. E.g., TRG will use 1000 points instead of line.
- Having a way point field, it's the original location. Even if all snapped, need to keep original observation.
- If you're processing, and snapping while you're processing, people want shape files to see. Maybe NOAA would be worried about just getting the raw data. Recommend: maintaining and providing both in the data storage, raw and post-processed. If you are modifying the geometry, snapping, might recommend modified geometry as well. Associated information, gpx file – now have

photos, field notes/scanned field notes, it's a change in the processing flow. How to get all of this to the SCAT data team.

Are there ideas about collecting data a certain way that the data standards would not allow?

Notes:

If we recommend a data exchange format, what should the format data be, including attributes and spatial information? Should we recommend a format for transmission from the field to the Unified Command, and/or transmission as part of a data package to external users?

Notes:

Exchange – text file or code set, make it flexible so you can add other types

Enterprise, class exchange format, web services not included – this was intentional. Recommend: Include/reference web services.

One step removed from the data management system, how to integrate different SCAT data collection during response (and after)? Can include small exchanges up to full packages. Shape files, field names are truncated to 10 characters to accommodate for shape files. People don't work from shape files anymore, but used for transfer. Transfer two packages/types of file formats: a file geodatabase or GIS files: tabular and spatial data.

Recommend: More guidance, smaller set of specified formats, but keep flexibility

What are the best practices with respect the SCAT Data Standard?

Notes:

The data standard is the best practice. If you have additional information outside of the standard, it should be well documented, should follow the same format.

Metadata: How much info do you want? If Polaris or Coral with the package, there should be an adjacent file. While trying to keep the standard to minimum, is it enough? It's key for snapping. Documentation for the process of how they cleaned up the data (so you don't have to reverse engineer). Recommend: Add processing info; additional attributes should match the field name descriptions; related files/links

Related to segments, Recommend: keep versions, add the start and stop date

Standard is focused on marine wrt to NOAA's interest. Can "de-marine" the standard to open up to other environments, e.g., freshwater, Arctic

Recommend start and stop lat/long for a line

Maintain and provide in data storage, raw and post-processed

Data exchange formats: More guidance, smaller set of specified formats, but keep flexibility

Web services: Include/reference the topic of web services

Address raw data more explicitly

Group A
Breakout Session II: Technical Q&A of the Data Standard
SCAT for Tomorrow Workshop

Additional Notes:

Notes:

Will still be in the field with paper and pen, and use the tablets back in the car/boat, etc. Still have to write notes by hand. Use device to collect geometry, photos (geo-referenced), etc.

Is there are a policy to how far off a point is from the standardized, commonly accepted shoreline? Is there a topological check – within ½ mi from line? No, best judgement.

Data standard supports points, linear and potentially polygonal.

Recommend: address raw data more explicitly.

GROUP B: BREAKOUT SESSION II: DATA HANDLING AND EXERCISE DEVELOPMENT

Thursday, January 19, 2017 at 8:45 AM

What are the data sharing plan expectations for SCAT package transfer/exchange?

Notes: This is looking at the elements of the data sharing plan that describes what SCAT data we'll share when, how, and to whom. We're assuming that the data sharing plan has been created and signed by the UC.

- Existing response and NRDA data sharing templates should be reviewed as part of path forward.
- Expectations that we'll be developing general recommendations on data sharing related to all spills and exercises.

During Response:

- Who – Operations, SITL, JIC, DOCL, EU, LNO, jurisdictional entities, leadership
- What – SCAT segment report, STRs, products such as maps, photos, etc. in a format useable (per the data model) by the customer.
- When – depends on the product and the audience, but generally after QAQC – must be timely to support the response. Operations time line associated with product availability. Time line goes through NRDA and Docs Unit.
- How -- Protocols for transfer (FTP site, cloud, COP, etc.), version control/notification to customers of new data

Post Response:

- Who – signatories on the data sharing plan
- What – all of the above including the raw data
- When – later
- How – preferably same as response
- Time line goes through NRDA and Docs Unit.

What are the logistics of managing the SCAT package transition as part of data sharing?

Notes:

- **Products and data sharing might evolve over the incident – our input is assuming during the response.**

What is in that package (high level)?

Notes:

- **Products**
    - **Complete raw data package**
    - **Value added products (dashboard, maps, segment reports, STRs, georeferenced photos/videos/imagery etc.)**

- **QAQC status**
  - **Provisional/non-QAQC'd information (such as oiled wildlife) could be shared to the appropriate customers.**
  - **Including confidence statements or where it is in the QAQC process. The confidence could be qualitative.**
  - **This also varies with who is using the data.**

What are the expectations for SCAT products and timing of production?

Notes:

What are the best practices with respect to data handling and exercise development?

Notes:

- Use data sharing (including SCAT data) as an objective in exercise(s).
- Pre-qualified and trained SCAT team members
  - Address the paper vs electronic data capture transition
  - Include at least one electronic scribe
- Qualified/trained SCAT data managers.
- Team leads and SCAT data managers need time for adequate verification of day's products/data
- During exercises, provide realistic time line for SCAT products
  - Using NOAA SCAT manual, develop estimates of time line for SCAT data products
- SCAT tool interoperability – tested in exercise
- Capture and share (RRTs, area committees) lessons learned associated with SCAT data management
  - Look at the rollout of COP for specific lessons learned that could be applied to SCAT

GROUP C: BREAKOUT SESSION II: QA/QC AND DATA FLOW

Thursday, January 19, 2017 at 8:45 AM

What are the expectations for data and product quality review and approval in the workflow process?

Notes:

- Field teams are not responsible for SCAT product development.
- Team lead must oversee data (whether it is paper or digital). This has verbal component/interaction. Data entry process.
  - Team lead responsible for data quality (quantitative)
  - Data team is responsible for completeness
  - SCAT manager is overseeing/reviewing the content entered
    - Data manager controls the accurate/missing information uploaded
    - Built-in QA in electronic system
    - QAQC needs to be more explicit now where it was implicit previously
    - How do you flag the data management system and track this. We need to track any changes/corrections.
    - Possible data corruption in transition/upload. Need review on both ends.
  - QAQC is done before a product is developed
- Field notes are entered into some kind of collector. So when it leaves the team lead it is already in a digital format. Team QAs their delivery.

How does that fit into future workflows?

Notes:

- Have right (experienced/consistent) people on the team
- Unless previous QAQC is done there is no other workflow
- Team QAs data prior to submission
- Completeness and accuracy by data manager
- Team lead QCs input and post upload
- SCAT coordinator does several high-level spot-checks to assure data quality/content/consistency is correct
- There needs to be a QA of processed field data and products

What are the expectations for SCAT products and timing of production?

Notes:

- Management expectations are always unrealistic
- SCAT daily (text summary, identification of oil, location tomorrow) report can/should be aligned with the planning cycle
  - Information for ICS 209 and for SCAT 204
- IC may be on a 24-hour action plan but SCAT STR has a lag
  - STRs developed for operations 204s
- What information/data can we give out quickly (clear tagging of data QAQC; identify data in process; priority 1,2,3)

- How can we pre-identify data that can be given out early; there is risk and danger that preliminary products may have a life of their own and do not create accurate products
- Flexibility is needed in how we reach the SCAT objectives through data generation
- Articulate the standard products and the timeframe
- Are there early feedback products that can be pre-identified?
    - Heavy vs light oiling
    - Recon SCAT (known fact: these early products are going to change)
    - Understand that even tho we are using electronic data it does not correlate to getting product faster
    - End users do not realize that these products change. Need a mechanism to communicate a change in from recon to standard SCAT (triage vs medical care) within the context of Incident Action Plan
    - Manage the command with products that we know the IC needs asap
- Ideally the SCAT plan is driving the document. Better inform this process to end user. Managing the expectations. Explain this process succinctly.
    - Generics products have limited lifespan, such as for bulk oil removal
    - The SCAT coordinator is responsible for everything, including communications and managing expectations.

What are the best practices with respect to QA/QC and data flow?

Notes:

Manage expectations through explicit list of products and delivery time table for each product

- Recognizing phase transition in the SCAT process (recon/bulk oil removal, systematic /STR, inspection/SIR)
- Expectation the products and timeline may change through the different phases
- Ability to scale (scalability/flexibility) the SCAT program based on size and complexity of event
- SCAT coordinator has ultimate QAQC responsibility and delegates according to scale

Multi stage QAQC:

- Team lead must oversee data (whether it is paper or digital). This has verbal component/interaction. Data entry process.
    - Team lead responsible for data quality (quantitative)
    - Data team is responsible for completeness
    - SCAT manager is overseeing/reviewing the content entered
        - Data manager controls the accurate/missing information uploaded
        - Built-in QA in electronic system
        - QAQC needs to be more explicit now where it was implicit previously
        - How do you flag the data management system and track this. We need to track any changes/corrections.
        - Possible data corruption in transition/upload. Need review on both ends.
    - QAQC is done <u>before</u> a product is developed

Group C
Breakout Session II: QA/QC and Data Flow
SCAT for Tomorrow Workshop

Clearly identify the completion flags/elements/process/tracking for QAQC status Health and safety SCAT program is adapted to the environmental conditions

Appendix G: Data Sharing Plan Templates

Response Data Management and Sharing Plan
[Incident Name]

Purpose:

Information and data generated as a result of the response, mitigation efforts, or other similar activities (the "Response") related to the [Incident Name] (the "Incident"), are used in support of the Unified Command's Critical Information Requirements (CIRs). This Data Management and Sharing Plan (the "Plan") is meant to ensure continuity of information across the various CIRs and facilitate sharing amongst the response personnel during the incident. Furthermore, this plan will set the foundation for access to information and archive of data.

Implementation of this plan will:

- Reduce compartmentalized isolation of information within ICS units and sections
- Ensure all parties understand responsibilities, methods, and resources available
- Maintain information continuity over time regardless of personnel changes
- Provide the basis for periodic review, evaluation, and updating of procedures
- Ensure the proper archival of data for post-incident retrieval and analysis

What is covered under this Plan:

This plan includes all incident related documents, Geographic Information Systems (GIS) data, photography, video, remote sensing, response sampling, response databases, and corresponding metadata as described in accompanying appendices.

The incident related information and data that may be **excluded** under the scope of this plan are:

1. Proprietary, confidential, privileged or non-incident related information or data.
2. Licensed, sensitive, or cultural resources as determined by data provider.
3. Information developed for the sole purpose of the Natural Resource Damage Assessment (NRDA).

The overarching objective of this plan is to facilitate availability of information to all parties involved in the response. The Documentation Unit and Situation Unit were integral to the development of this plan and the establishment of daily documentation and sharing procedures.

Unified Command Signatures:

United States Coast Guard FOSC	______________________________	_______________ Date
State Representative	______________________________	_______________ Date
Responsible Party (RP)	______________________________	_______________ Date

This Plan does not supersede the Incident Command Post (ICP) Documentation Plan. This plan describes, in technical detail, information sharing between the United States Coast Guard, the Responsible Party (RP), and other organizations in the Unified Command.

I. DATA MANAGEMENT AND SHARING PROCESS:

This describes the different types of incident data and provides details about file types, descriptions, temporal coverage, processing responsibilities, point of contacts, storage locations, access restrictions, and sharing schedules. As stated previously, data covered by this Plan include all GIS data, photography, video, response sampling, remote sensing, and response databases not excluded by agreed exclusions.

Except as required by law, for any data to be released to the public the data must be approved and released by the Unified Command.

Refer to Appendix I tables for detailed descriptions of data and sharing.

II. DATA PRESERVATION & PROTECTION:

Short-Term Storage (incident start to end of response):
Proper storage during the response will facilitate data usage to support operations and planning. An official repository will be designated for the incident.

Long-Term Storage (end of response to indefinite):
All data referenced in this plan would fall under the Document Management Plan for the incident. Data is subject to the Documentation Unit processes for retention and storage.

Archive Management:
The Federal On-Scene Coordinator (FOSC) has established a plan in accordance with the documentation of pollution response activities as mandated by the National Contingency Plan (NCP), in accordance with 40 CFR §§ 300.160 and 300.315.

The Incident Archive will consist of all documents generated as the result of the incident. Documents broadly include any form of recorded information created for use. This includes:

- Any information written on paper, paper documents, electronic documents, and email.
- Any photography, GIS data, sampling data, remote sensing, video, databases, spreadsheets, etc.

The United States Coast Guard is the Federal financial lead; therefore, the United States Coast Guard is solely responsible for managing and maintaining the Federal Incident Archive. Copies of the archive will be provided to the State, RP and other members of the Unified Command.

Additional theme areas described in Appendix

III. COMMON OPERATING PICTURE

IV. DATA INFRASTRUCTURE AND HARDWARE

V. METADATA AND FILE NAMING

VI. REFERENCES

Please refer to the tables in the corresponding Appendix document for detailed descriptions of data providers, data types, archiving, and sharing.

APPENDIX I: Data, Sharing and Archive Process

This appendix describes the different types of incident and related data being created and covered under the Plan to meet Critical Information Requirements (*CIRs) of the Unified Command (UC). It provides specific details about file types, processing responsibilities, delivery schedule and use restrictions. It also describes who is managing the data, how and when the data will be shared and disseminated to other response staff, if there are any sharing or use restrictions, and how sharing would be managed for the public if appropriate*.*

This outline describes the functional sections of this appendix. Each Section provides a description and table to capture the pertinent information being created and the operational cycle that each dataset will support for addressing UC CIRs.

Section I – DATA MANAGEMENT AND SHARING PROCESS
- GIS Data
- Photography & Video
- Remote Sensing
- Response Sampling
- Response Databases

Section II – DATA PRESERVATION AND PROTECTION
- Short-Term Storage
- Long-Term Storage
- Transfer to Long-Term Storage

Section III – COMMON OPERATING PICTURE
Section IV – DATA INFRASTRUCTURE AND HARDWARE
Section V – METADATA AND FILE NAMING
Section VI – REFERENCES

* For any data to be released to the public, it must be approved and released by Unified Command.

SECTION I - DATA MANAGEMENT AND SHARING PROCESS:

Except as required by law, for any response data to be released to the public during the response, it must be approved and released by the Unified Command.

GIS Data:
Data are either gathered from existing work to act as base data for the incident, or created by Data Management/GIS Technical Specialists in the GIS Unit, Environmental Unit, or Situation Unit within the Planning Section. Technical specialists for GIS and Data Management will have the primary responsibility to manage the lifecycle of this data, including processing raw data into maps or products for a COP. The tables below should include all incident related data but this many not be exhaustive. Data may continue to be added to this list throughout the response. The intent is track all relevant data being developed for the response, identify who is managing them and how to access the data.

Static GIS files (e.g. shapefiles, layer packages, and geodatabases) should be uniquely named and include a time/date stamp of the date of creation for version history and to prevent overwriting previous files. Data feeds (e.g. web service and ArcRest) can be used to share data, however due to potential technical issues with respect to data feed stability, changing layer IDs, legend formatting, and external access, a copy of these data shall be transferred in the form of a layer package or geodatabase to the agreed upon response data repository (e.g. secure FTP server, local server, etc.).

Protocol for Sharing: *example: GIS Unit transfers through the NOAA SFTP (or other system as determined by Situation Unit) every two hours a GDB with data that has changed. Gathering of RP, RP Contractor, and Federal GIS responders daily before end of day to get on same page and distribute tasks for next Op period.*

Dataset	Data Type & Format	Description	Temporal Coverage	Delivery Schedule	Use Restrictions	Method of Field Collection	Field Collector & P.O.C.	Data Processor & P.O.C	Short-Term Repository
Trajectory Forecasts	*Model Output, Raster*	*Fate and transport forecasts for oil based on oceanographic and weather conditions*	*Forecasts out 48 and 72 hours*	*Once daily*	*Response only*	*Model output and field initialization*			*RP GIS unit, RP COP, ERMA, NOAA SFTP, RP Central Data Server*

Overflight oil extent	*GDB, SHP*	*Based on overflight observations this depicts the extent and transport of oil. Helps to initialize trajectory forecasts.*	*Ephemeral*	*Twice daily*	*Response only*	*Overflight observers and GIS analysts*	*RP, NOAA, USCG*	*GIS unit*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*
SCAT	*GDB, SHP*	*Shoreline Cleanup Assessment Techniques*	*Ephemeral*	*Once daily*	*Response only*	*SCAT Teams*	*SCAT Coordinator*	*SCAT Data Managers*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*
Response locations and boundaries	*GDB, SHP*	*ICP location, Staging Areas, Saftey Zones, Security Zones*	*Valid until changed*	*As needed*	*Some public*	*Logistics and Operations Sections*	*OSC, LSC*	*GIS Unit*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*
Operational data	*GDB, SHP*	*Task Force locations, Operations Assets, Shoreline cleanup*	*Ephemeral*	*As needed*	*Response only*	*Operations Section*	*OSC*	*GIS Unit*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*
Insitu Burn	*GDB, SHP*	*Burn locations and InSitu Burn safety zones*	*Ephemeral*	*As needed*	*Response only*	*Operations Section*	*OSC, InSitu Burn unit*	*GIS Unit*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*
Dispersant Application	*GDB, SHP*	*Locations of dispersant application both air and on-water based*	*Ephemeral*	*Once daily*	*Response only*	*Operations Section*	*OSC, Dispersant Operations*	*GIS Unit*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*
Waste Transfer and Management	*GDB, SHP*	*Locations of waste management transfer stations and final disposal sites*	*Valid until changed*	*As needed*	*Response only*	*Logistics, Planning and Operations Section*	*LSC, OSC, PSC, Waste Management Unit*	*GIS Unit*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*

Archeological/SHPO	*SHP*	*Archeologically sensitive sites or state preservation areas*	*Static*	*N/A*	*Highly Sensitive*	*State SHPO, LOSCO*	*State SHPO*	*State SHPO*	
Fisheries Closures	*SHP*	*Areas closed to commercial and recreational fishing and harvesting*	*Valid until changed*	*As needed*	*Public*	*State or Federal regulatory agencies*	*USDA, NOAA*	*State or Federal GIS*	*RP COP, ERMA, NOAA SFTP, RP Central Data Server*

Photography & Video:
Once photography comes to the ICP it should be managed in the designated data repository. The GIS Unit will process and upload photography and associated GPS files to this location.

Field teams must ensure they are following appropriate protocols for field photo and video collection by coordinating with the photo and video data managers (Technical Specialists) before going into the field. These data are more valuable to the response when collected with corresponding location information from a GPS. The processing software used varies, but the purpose is to catalogue and organize response photos and video that are specific to a geographical location. Below is a documentation of where data exists within the response infrastructure and who is managing it.

Dataset	Data Type & Format	Description	Temporal Coverage	Delivery Schedule	Use Restrictions	Method of Field Collection	Field Collector & P.O.C.	Data Processor & P.O.C	Short-Term Repository
RP Aerial Imagery	*Photo and Video*	*Response photography and video from a UAV*				*Registered Quadcopter*			*RP Central Server, NOAA SFTP, Local Hard drives*
Wildlife Observations	*Photo*	*Opportunistic wildlife sightings from daily overflights*				*Helicopter*	*RP, NOAA, USFWS*	*Response Data Management Unit*	*RP Central Server, NOAA SFTP, Local Hard drives*
Overflight Oil Observations	*Photo*	*Photos of oil on water from daily overflights*				*Helicopter*	*RP, USCG, NOAA*	*Response Data Management Unit*	*RP Central Server, NOAA SFTP, Local Hard drives*

Remote Sensing:
Remote sensing products will largely come from external organizations and not normally from direct efforts within the response organization. Examples are commercial satellite companies, federal remote sensing offices, and private remote sensing companies. The raw data will more than likely be managed and stored with the owner's infrastructure. The response organization would receive the final analysis products to utilize in response. Below is a documentation of what remote sensing efforts are being used, what products are being requested, and primary contact information.

Dataset	Data Type & Format	Description	Temporal Coverage	Delivery Schedule	Use Restrictions	Method of Field Collection	Field Collector & P.O.C.	Data Processor & P.O.C	Short-Term Repository
Oil Extent Imagery	*Remote Sensing: SAR, Multi-Spec, IR*	*Oil extent imagery from either satellite based platforms or fixed wing.*	*Best Available*	*Best Available*		*Logistics Section (213RR)*	*NOAA NESDIS, External Remote Sensing*		*RP Central Server, NOAA SFTP*

Response Sampling:
During a response multiple sampling efforts may be developed and implemented for a variety response endpoints. This table is meant to document what efforts are being pursued, what products are being developed, product schedule, use considerations and primary contact information.

Protocol for Sharing: *example: As response sampling is done and databases are linked or shared with the RP Central Data Server a copy will be provided to NOAA's DIVER and to a system LOSCO agrees to. As updates are made to any databases copies will be shared with both Federal and State systems (NOAA's DIVER and State system). The vice versa is true if Federal agencies or State representatives take samples for response related work.*

Dataset	Data Type & Format	Description	Temporal Coverage	Delivery Schedule	Use Restrictions	Method of Field Collection	Field Collector & P.O.C.	Data Processor & P.O.C	Short-Term Repository
Real-Time Air Monitoring	*Field samples*	*Operational air sampling. Metadata and physical parameters of samples.*				*Log Book and Mobile App*		*Delivery: Sync to SQL Server*	*RP central Data Server, NOAA DIVER*
Personal Sampling	*Field samples*	*Operational sampling. Metadata and physical parameters of samples.*				*Log Book and Mobile App*		*Delivery: Sync to SQL Server*	*RP central Data Server, NOAA DIVER, SCRIBE*
Personal Sampling	*Analytical results*	*Results data for samples*				*Lab EDD*		*Delivery: Lab EDD verified RP Data Managers and imported to SCRIBE*	*RP central Data Server, NOAA DIVER, SCRIBE (Not published)*
Personal Sampling	*Validated analytical data*	*Validation data from third party validators*				*Lab EDD edited by Validation personnel to change flags for specific fields*		*Delivery: Lab EDD verified by third party and imported to SCRIBE*	*RP central Data Server, NOAA DIVER, SCRIBE (Not published)*
Environmental Sampling	*Field samples*	*Operational sampling. Metadata and physical parameters of samples.*				*Log Book and Mobile App; Delivery: Sync to SQL Server*			*RP Central Data Server, NOAA DIVER, SCRIBE Respository / Field Documents*

Environmental Sampling	*Analytical results*	*Results data for samples*				*Lab EDD; Delivery: Lab EDD verified RP Data Managers and imported to SCRIBE*		*Delivery: Lab EDD verified RP Data Managers and imported to SCRIBE*	*RP Central Data Server, NOAA DIVER, SCRIBE Respository*
Environmental Sampling	*Validated analytical data*	*Validation data from third party validators*				*Lab EDD edited by Validation personnel to change flags for specific fields*		*Delivery: Lab EDD verified by third party and imported to SCRIBE*	*RP Central Data Server, NOAA DIVER, SCRIBE Respository*
Water Column Monitoring	*Field Samples*	*Operational sampling. May incorporate SMART monitoring. Metadata and physical parameters of samples.*				*SMART monitoring*			*RP Central Data Server, NOAA DIVER, SCRIBE Respository*
Oil Characterization Sampling	*Field Samples*	*Operational sampling. Metadata and physical parameters of samples.*				*Physical samples, COC forms*	*RP, NOAA, USCG,*	*RP Lab, , USCG Lab,*	*RP Central Data Server, NOAA DIVER, SCRIBE Respository, State system*
Oil Characterization Sampling	*Analytical results*	*Results data for samples*					*RP, NOAA, USCG,*		

Response Databases:
During a response multiple databases may be used for various types of data. This table is meant to document what efforts are being used, what products are being developed, product schedule, use considerations and primary contact information.

Database	Data Type & Format	Description	Temporal Coverage	Delivery Schedule	Use Restrictions	Method of Field Collection	Field Collector & P.O.C.	Data Processor & P.O.C	Short-Term Repository
RP Central Data Server	*Data Warehouse*								
NOAA DIVER	*Data Warehouse*	*NOAA's data warehouse capable of storing and querying both structured and unstructured data and analytical chemistry.*					*NOAA*	*NOAA*	*Amazon Cloud*
NOAA SFTP	*Secure File Transfer Protocol*	*Secure File Transfer Protocol setup by NOAA as a working repository for responders.*					*All responders*	*All responders*	*Federal Servers*
CTEH File Transfer									
SCAT Database		*The database for managing daily SCAT observations. Also includes all forms and field documents.*							

SECTION II - DATA PRESERVATION & PROTECTION:

Short-Term Storage (incident start to end of response):

There are three constructs for short-term storage during an incident:

1. Data backup – In order to protect data from accidental modifications, deletions, or disaster events, each data manager is required to ensure a backup method for their daily work, such as an external hard drive or external server.
2. Primary GIS or database storage - Data managers may have systems in place to store the working copy of their daily data collections and products, such as ArcGIS Server, SCRIBE sampling database, or SCAT database. The final daily product from these working directories would be shared in the repository described next.
3. Shared Response Data Repository - A designated response data repository will act as a working environment for all data managers so data can be shared without needing to grant access to firewalled proprietary systems. This is critical to sharing data across different private, state, and federal agencies. This repository will eventually be transferred to the final archive.

Long-Term Storage (end of response to indefinite):

The incident archive will be managed and maintained by the United States Coast Guard Incident Historian according to agency policy; a copy of the incident archive can be made in its entirety upon request. Additionally, other agencies may set up their own data archive to ensure it meets their agency requirements.

Archive Owner	Storage Location	P.O.C.
USCG (Federal Copy)	*USCG Archive Facility*	*USCG*

Transfer to Long-Term Storage:

Data type	Transfer method
GIS Data	
Photography and Video	
Remote Sensing	
Response Sampling	*Validation of both RP and NOAA databases to ensure they are the same*
Response Databases	*Final transfer of file structure copies to all Archive Owners*

SECTION III - COMMON OPERATING PICTURE:

This section serves to catalogue and describe the Common Operating Pictures (COP) involved during an incident.

A designated COP does not preclude the use of other viewers for individual responder or organizational use, provided that everyone has access to consistent, up-to-date data. A daily exchange cycle should be described for data delivery requirements. The following points should be discussed:

- Data must be interoperable with appropriate systems
- Situation Unit oversight/QA of data to ensure continuity and access during the response
- Timelines of data delivery, communication for sharing data in other data viewers
- Basic metadata on file creation (who, what, where, when)

COP	Description	Response Function	Method of data access	POC
ERMA	*Web-based visualization tool for response data and critical information*	*Response COP*	*Requested user account; web-based*	
RP COP				

SECTION IV - DATA INFRASTRUCTURE AND HARDWARE:

This section outlines the designated, centralized, data storage applications used during the response.

The response data repository is a working environment where daily operational period data are to be shared between GIS analysts and other designated responders. A data repository is critical to sharing GIS data across different private, state, and federal agencies.

Response Repository: [organization] has provided an On-scene Response Server or accessible, offsite storage location to act as a repository for all data governed by this plan. It is being managed by the [organization] and access will be provided to the Unified Command (including the RP) and to NOAA.

Data Storage Application	Description	Location	Method of data access	POC for access

NOAA Secure FTP	*NOAA Secure FTP*	*Sftp.orr.noaa.gov*	*internet*	
RP File Transfer				

SECTION V - Metadata and File naming:

Minimum Metadata requirements[5]:

- Source of the information
- Date of capture
- Contact
- Description of the information
- Any processing done to change the source information
- Any known limitations or issues with the information
- Geographic area of coverage
- Quality of data

Filename convention:

- Shapefile names must include the type, date of publication (if applicable), and time of observation (if applicable). Note there is a 50 character limit for shapefile names.
- *Example: WildlifeObservations_2012_0504_1300hrs.shp*

Filing Standards/best practices:

- All folder names in Spatial_Data should use underscores not spaces, dashes, or any other character to split naming description.
- GPS data (.GDB, .GPX or Shapefile) should be included with the photos under the Name level in the Photos file structure.
- Personal folders are for “working” versions of data or GIS project templates, but should be transferred over to the main filing structure when finished.
- Filenames must include the type, date of publication (if applicable), and time of observation (if applicable).
- *Example: WildlifeObservations_2012_0504_1300hrs.pdf*

Filing Structure Template examples:

- Spatial_Data
    - Type (Ex. Wildlife_Observations)
        - Date (YYYY_MMDD)
- Maps
    - Type (Ex. Overflight Observations)
        - Date (YYYY_MMDD)
- Documents
    - Type (Ex. Resources_at_Risk)
        - Date (YYYY_MMDD)
- Photos
    - Type (Ex. SCAT)
        - Date (YYYY_MMDD)
            - Team
                - Name
- Personal_Folders
    - Name

- Tools_Software

SECTION VI – REFERENCES:

1) USCG Incident Management Handbook. 2014

2) USCG Records Management. CG-611 Management Programs and Policy Division.
   a) The primary purpose of the Coast Guard's records management program is to promote the maintenance and security of records, to ensure we have accurate and timely information to accomplish our missions, allow accessibility to information to staff and the public as appropriate, and preserve official records in accordance with applicable statutory and regulatory requirements.

      The term "record" is not limited to paper documents, but includes all media, e.g., audiovisual, cartographic, electronic, etc. Records can be either temporary or permanent; temporary records are destroyed after a specified/approved period of time while permanent records are preserved by the National Archives for the life of the republic. Typically, for any government agency, less than five percent (5%) of the records are scheduled as permanent; the Coast Guard has almost 25% scheduled as permanent records.

      All Coast Guard personnel have basic Records Management responsibilities. Originators and recipients of both paper and electronic records (including e-mail) must label and archive information per approved dispositions schedules outlined in:

      Information and Life Cycle Management Manual, COMDTINST M5212.12A., and
      NARA Approved Changes to COMDTINST M5212.12A (updated June 7, 2013)

3) NOAA Environmental Data Management Committee (EDMC) Data Management Planning Procedural Directive, Version 2.0.1, February 11, 2015.

4) National Oil and Hazardous Substances Pollution Contingency Plan (NCP)

5) IPIECA-IOGP. Work Package 5: Common Operating Picture, IPIECA – IOGP Oil Spill Joint Industry Project. 2015.

Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

1. PURPOSE:

Data generated as a result of the response, or germane to the mitigation of the incident, are used to generate a Common Operating Picture (COP) display and provide information for the Situation Status Display to support and communicate the Unified Command's response decisions. This Plan is meant to ensure continuity of information across the various information requirements within the Unified Command and facilitate sharing amongst the response personnel during the incident. Furthermore, this Plan will set the foundation for archive and access to data used for these purposes. The scope of this Plan includes all operational and environmental Geographic Information Systems (GIS) data, photography, video, remote sensing, response sampling, and response databases created, acquired or possessed by the Unified Command used to make response decisions or to support the generation of the Common Operating Picture and the Situation Status Display.

Implementation of this plan will:

- Help to avoid compartmentalized isolation of information within the ICS units and sections
- Ensure all parties participating in response decisions and the ICS structure understand the responsibilities, methods, and resources available to facilitate those decisions
- Help maintain information continuity over time regardless of personnel changes
- Provide the basis for periodic review, evaluation, and updating of procedures
- Help ensure the proper archiving of data for post-incident retrieval and analysis
- Ensure confidence among Unified Command members that information will be received, controlled and retained in accordance with this plan to minimize inadvertent and unauthorized release of information

Information gathered pursuant to any investigation of this Incident is not response related information and will be excluded from the scope of this Plan. Response related information and data that may be excluded under the scope of this Plan are:

- Proprietary or non-incident related information or data.
- Licensed, sensitive, or cultural resources as determined by data provider and applicable law.
- Information developed for the sole purpose of the Natural Resource Damage Assessment (NRDA).
- Proprietary instrument data.
- Any information, records or data, the disclosure of which is exempted or prohibited pursuant to federal or state law.

The overarching purpose of this Plan is to facilitate availability of information to all parties participating in the management of the incident and with appropriate authority to be involved in making response decisions. The plan will outline in detail the identification, management, and sharing of data pursuant to this Data Management and Sharing Plan and is a component to the overall Information Management Plan developed by the Documentation Unit.

2. DATA TYPES:

This section describes the different types of incident data being collected that can be used to make response decisions, create static and dynamic maps, generate a Common Operating Picture (COP) display, or provide information for the Situation Status Display.

2.1. GIS Data:

GIS Data are either gathered from existing work to act as base data for the incident, or created by Data Management/GIS Technical Specialists in the GIS Unit, Environmental Unit, or Situation Unit within the Planning Section of the Unified Command. Technical specialists for GIS and Data Management will have the main responsibility for the entire lifecycle of this data, including processing raw data into static/dynamic maps or products for a Common Operating Picture. The Data Inventory List should contain a description of the GIS data being collected as described in Section 4.1 of this document.

2.2. Photography & Video:

Field teams must ensure they are following appropriate protocols for field photo and video collection by coordinating with the photo and video data managers (Technical Specialists), to the extent feasible, before going into the field. These data are more valuable to the response when collected with corresponding location information from a GPS and associated annotations. The processing software used varies, but the purpose is to catalogue and organize response photos and video which are specific to a geographical location. The Data Inventory List should contain a description of the photographic and video data being collected as described in Section 4.1 of this document.

2.3. Remote Sensing:

Remote sensing products will largely come from external organizations and not normally from direct efforts within the Unified Command; examples include, commercial satellite companies, federal remote sensing offices, and private remote sensing companies. The raw data will more than likely be managed and stored with the owner's infrastructure. The Unified Command should receive the final analysis products to utilize in the overall response effort. The Data Inventory List should contain a description of remote sensing efforts being used, what products are being requested, and relevant contact information as described in Section 4.1 of this document.

2.4. Response Sampling:

Response sampling includes any analytical and monitoring data or information gathered for purposes of making response decisions consistent with the overall response objectives. The Data Sharing Inventory List should contain a description of the analytical and monitoring data being collected as described in Section 4.1 of this document.

2.5. GIS Baseline Databases:

During a response multiple databases may be used for various types of historical baseline data, shapefiles, layer packages, and other geodatabases to provide context and comparative information to aid in the establishment of Critical Information Requirements and provide relevant background information to assist in making response decisions. The Data Sharing Inventory List should contain a description of the baseline data being used and identify the source(s) of the data as described in Section 4.1 of this document.

3. DATA SHARING:

This section outlines the types of data being created to meet Critical Information Requirements (CIRs) necessary to achieve the response objectives as determined by Unified Command, who is managing them, who they will be shared with, how and when they will be shared and disseminated with other response staff, if there are any sharing restrictions to response staff or the public. Any data sharing restrictions or access conditions specific to an individual data stream will be identified in the Data Inventory List included as an appendix to this document.

3.1. Incident Data:

All data used by the UC in making response decisions can be shared in multiple formats to ensure effective data accessibility and records management. All data streams collected for utilization within the incident command and control structure are restricted to access by personnel with an active role within the designated Incident Management Team (IMT). Unified Command may grant specific permissions for access to incident information to individuals outside of the designated IMT on a case-by-case basis.

3.2. GIS Data:

Static GIS files (e.g. shapefiles, layer packages, and geodatabases) should be uniquely named and include a time/date stamp of the date of creation for version history and to prevent overwriting previous files. Data feeds (e.g. web service and ArcRest) can be used to share data, however due to potential technical issues with respect to data feed stability, changing layer IDs, legend formatting, and external access, a copy of these data shall be transferred in the form of a layer package or geodatabase to an agreed upon response data repository (e.g. SFTP server, SharePoint site, etc.).

Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

All GIS data should be copied to this repository at the appropriate time cycle required for these data to ensure accessibility and record integrity for the response. This will allow the response to have a static copy of data accessible by Unified Command members and act as a backup in case of system or server failure.

The initial and shared response data repository for GIS Data will be determined by origination source of the data stream. The systems selected for the display of the GIS data in the Command Post will use the most secure setting which limits access to responders only. This system selected for the display of the Common Operating Picture (COP) will serve as a working environment where data can be shared between GIS responders without needing to grant access to firewalled proprietary systems. A data repository is critical to sharing GIS data across different private, state, and federal agencies.

Information and Data gathered and shared amongst members of the Unified Command to make response decisions as contemplated by the National Contingency Plan is not to be released outside of the Unified Command/ICS unless approved and released by Unified Command. Any subsequent California Public Records Act (CPRA) requests or Freedom of Information Act (FOIA) Requests must be closely coordinated amongst the parties to the Plan. The party to this Plan who originated documents, data or information shared pursuant to this Plan reserves all rights and authority to assert appropriate exemptions to the CPRA or FOIA to preserve the confidentiality of all response materials contemplated within the scope of this plan and exchanged pursuant to the terms of this Plan.

3.2.1. Minimum Metadata requirements

- Source of the information
- Date of capture
- Contact
- Description of the information
- Any processing done to change the source information
- Any known limitations or issues with the information
- Geographic area of coverage
- Quality of data

3.2.2. Filename convention

- Shapefile names must include the type, date of publication (if applicable), and time of observation (if applicable). Note there is a 50-character limit for shapefile names.
- Example: WildlifeObservations_2012_0504_1300hrs.shp

3.3. Photography & Video:

Once photography comes to the ICP it should be managed in the designated Response Server. The GIS Unit will process and upload photography and associated GPS files to this location.

3.4. COMMON OPERATING PICTURE:

A designated COP does not preclude the use of other data viewers for individual responder or organizational use, provided that everyone has access to consistent, up-to-date data. A daily exchange cycle should be described for data delivery requirements. The following points should be discussed:

- Data must be interoperable with appropriate systems
- Situation Unit oversight of data to ensure continuity and access during the response
- Timelines of data delivery, communication for sharing data in other data viewers
- Basic metadata on file creation

The Primary Common Operating Pictures (COP) to be utilized in the Command Post during the incident will be Select here to enter name of primary COP provided by Select here to enter name of COP provider . This does not preclude the use of other applications by members of the IMT to access and view shared data.

4. DATA PRESERVATION & PROTECTION:

4.1. Data Sharing Inventory List

The Data Sharing Inventory List should contain a description of the data being used to make response decisions or to support the generation of the Common Operating Picture and the Situation Status Display. The completed list will be included in Appendix B of this document and should include the following information:

- Data Type / Stream
- Dataset Name
- Dataset Description
- Data Type & Format
- Temporal Coverage
- Method of Data Collection
- Data Collector & P.O.C.
- Restrictions & Conditions for Display and Sharing
- Data Sharing Schedule
- Data Processor & P.O.C
- Initial Data Repository
- Shared Data Repository
- COP Layer Inclusion

Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

4.2. Data Archive

The incident data archive will be managed and maintained by Select here to enter agency name. According to agency policy; a copy of the incident archive can be made in its entirety to any signatories of this Plan upon request.

4.3. Data Back-Ups:

In order to protect data from accidental modifications, deletions, or disaster events, there must be a plan to ensure back up of data on personal external hard drives or to an external storage location(s). This plan must address short term and long term preservation of data. The short-term storage back-up plan is the responsibility of the owner/originator of the response database being managed.

4.4. Short-Term Storage (incident start to end of response):

Proper storage during the response will facilitate data usage to support operations and planning. The systems and processes for storing data are designed to quickly share and disseminate. These systems are not designed for long-term storage. At the end of the response phase, data will need to transition to a more stable solution.

4.5. Long-Term Storage (end of response to indefinite):

Long term storage is needed to provide an archive and continuity of information. The Select here to enter agency name. will manage the long-term storage of all documents, digital forms, operational and environmental Geographic Information Systems (GIS) data, photography, video, remote sensing, response sampling, and response databases; all documents will be turned in to the Select here to enter agency name. Upon closure of the Incident Command Post in accordance with the Incident Demobilization Plan. The appropriate data and information personnel will work with the Documentation Unit to transfer their materials. Copies of relevant response data will be provided to the signatories of this Plan and available for access upon request to the Select here to enter agency name. .

The appropriate data and information personnel will work with the Documentation Unit to transfer their materials to long term storage. The following table contains list of the agreed upon methodology for the transfer of data to long-term storage.

DATA TYPE	TRANSFER METHOD
GIS	Select here to enter text.
Photography & Video	Select here to enter text.
Response Sampling	Select here to enter text.
Remote Sensing	Select here to enter text.

Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

UNIFIED COMMAND SIGNATURES:

Select here to enter agency name.
Federal On-Scene Coordinator

By: ______________________________ Dated: Click to enter a date.

Select here to enter name.
Select here to enter title/rank.

STATE OF Select here to enter state name.
Select here to enter agency name.
State On-Scene Coordinator

By: ______________________________ Dated: Click to enter a date.
Select here to enter name.
Select here to enter title/rank.

Select here to enter company name.
RP Incident Commander

By: ______________________________ Dated: Click to enter a date.
Select here to enter name.
Select here to enter title/rank.

Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

APPENDIX A.

References

1) USCG Incident Management Handbook. 2014

2) USCG Records Management. CG-611 Management Programs and Policy Division.

   a) The primary purpose of the Coast Guard's records management program is to promote the maintenance and security of records, to ensure we have accurate and timely information to accomplish our missions, allow accessibility to information to staff and the public as appropriate, and preserve official records in accordance with applicable statutory and regulatory requirements.

   b) The term "record" is not limited to paper documents, but includes all media, e.g., audiovisual, cartographic, electronic, etc. Records can be either temporary or permanent; temporary records are destroyed after a specified/approved period of time while permanent records are preserved by the National Archives for the life of the republic. Typically, for any government agency, less than five percent (5%) of the records are scheduled as permanent; the Coast Guard has almost 25% scheduled as permanent records.

   c) All Coast Guard personnel have basic Records Management responsibilities. Originators and recipients of both paper and electronic records (including e-mail) must label and archive information per approved dispositions schedules outlined in:
   Information and Life Cycle Management Manual, COMDTINST M5212.12A., and
   NARA Approved Changes to COMDTINST M5212.12A (updated June 7, 2013)

3) NOAA Environmental Data Management Committee (EDMC) Data Management Planning Procedural Directive, Version 2.0.1, February 11, 2015.

4) National Oil and Hazardous Substances Pollution Contingency Plan (NCP)

5) IPIECA-IOGP. Work Package 5: Common Operating Picture, IPIECA – IOGP Oil Spill Joint Industry Project. 2015.

Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

APPENDIX B.

The attached Data Sharing Inventory List contains a description of the data being used to make response decisions or to support the generation of the Common Operating Picture and the Situation Status Display. Any changes to the Restrictions & Conditions for Display and Sharing or temporary access decisions must be approved by Unified Command and documented.

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Data Management and Sharing Plan

This Data Management and Sharing Plan (Plan) is for the Select here to enter Incident Name.

INCIDENT DATA INVENTORY LIST

NCY DATA MANAGER:	John Smith
TA MANAGER PHONE:	123-456-7890
ATA MANAGER EMAIL:	John.Smith@wildlife.ca.gov
RP DATA MANAGER:	Riochard Jones
TA MANAGER PHONE:	321-654-0987
ATA MANAGER EMAIL:	Richard.Jones@rp.com

INCIDENT NAME:	MT Dawn Horizon Allision
INCIDENT LOCATION:	Anchorage Nine, San Francisco Bay California
RP NAME:	Any RP
INVENTORY DATE:	6/24/2016
PRIMARY COP APPLICATION:	TRG Incident Action Plan Common Operating Picture
APPLICATION PROVIDER:	The Response Group

Item #	Data Type / Stream	Dataset Name	Dataset Description	Data Type & Format	Temporal Coverage	Method of Data Collection	Data Collector & P.O.C.	Restrictions & Conditions	Data Sharing Schedule	Data Processor & P.O.C	Initial Repository	Shared Repository	COP Layer
1	GIS Data	NOAA Trajectories	Shapefiles	Fate and effect modeling of oil for operational planning.	Forecast for next Op period	Models	NOAA	Command Post Viewing External release	As developed	NOAA	ERMA	TRG IAP	YES
2	Photography	Operations Photos	JPG & GPS files	Photos of field operations	Ad Hoc	Field teams	OSRO			RP GIS Unit	TRG IAP	ERMA	NO
3	Video	Operations Video	MPEG & AVI	Videos of field operations	Ad Hoc	Field teams	OSRO			RP GIS Unit	TRG IAP	ERMA	NO
4	Remote Sensing	Airborne Multispectral	Shapefiles and image files	Ocean Imaging Tactical Response Airborne Classification System (TRACS) 3-band multispectral camera plus thermal IR Detection. Used for slick mapping, thickness determination and identification of recoverable oil. Imagery with interpretation delivered to the ICP within two hours of acquisition.	Multi-day collection	Fixed wing aircraft	Ocean Imaging/RP			Ocean Imaging	TRG IAP	ERMA	YES
5	Response Sampling	Surface Water	Analytical	Sampling done for human health and safety. Identification of hydrocarbon contamination.	Multiple collection	RP	Approved multiple labs			On Scene database/OSPR sampling coordinator		No	NO
6	SCAT Data	Shoreline Cleanup Assessment Techniques (SCAT)	Shapefiles	Shoreline Cleanup Assessment Techniques oiling observations	Daily and Cumulative	Field obs	Joint Assesment Team			Cal OSPR, GIS Unit	ERMA	TRG IAP	YES
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To add new table rows for inventory items, select the last cell in the table above and then press the Tab key.

Data Inventory Template (Draft).xlsx

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